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Development and Structuring of Commercial Mortgage-Backed Securities in Australia

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DECLARATION

This thesis has been prepared by me to meet the requirements of a Doctor of Philosophy degree at the Curtin University of Technology.

I declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

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Signed: Bwembya C. Chikolwa

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List of Abbreviations

Abbreviation	Full Name/Term
ABS	Asset-Backed Securities
AHP	Analytic Hierarchy Process
ALN	Adaptive Learning Network
ANN	Artificial Neural Networks
ANOVA	Analysis of Variance
APPF	Australian Prime Property Fund
APPT	Australia Prime Property Trust
APRA	Australian Prudential Regulation Commission
ASIC	Australian Securities and Investments Commission
ASX	Australian Stock Exchange
AU$	Australian Dollar
BBSW	Bank Bill Swap Rate
bp	Basis Points
BP	Backward Propagation
CBD	Central Business District
CBRE	CB Richard Ellis
CDO	Collateralised Debt Obligations
CMBS	Commercial Mortgage-Backed Securities
CPIT	Commonwealth Property Investment Trust
CRE	Corporate Real Estate
CR-REIT	Corporate Restructuring Real Estate Investment Trust
DA	Financial Leverage
DPP	Deferred Purchase Price
DPS	Direct Property Syndicates
DSCR/OCD	Debt Service Coverage Ratio
EU	European Union
FASL	Financial Asset Securitisation Law
FHA	Federal Housing Administration
GD	Geographic Diversity
GDP	Gross Development Product

GPT	General Property Trust
HHGR	Herfindahl Geographic Region Index
HHPT	Herfindahl Property Type Index
HK$	Hong Kong Dollar
IPD	Investment Property Databank
IPO	Initial Price Offering
ISPT	Industry Superannuation Property Trust
IVSC	International Valuation Standards Committee
JLL	Jones Lang LaSalle
JPY	Japanese Yen
K-REIT	Korean Real Estate Investment Trust
LCR	Loan-to-Cost Ratio
LPT	Listed Property Trust
LRM	Logistic Regression Model
LS_1	Office Listed Property Trust
LS_2	Retail Listed Property trust
LVQ	Learning Vector Quantisation
LVR	Loan-to-Value Ratio
MBS	Mortgage-Backed Securities
MCWF	Macquarie Country Wide Trust
MDA	Multivariate Discriminant Analysis
MRA	Multiple Regression Analysis
NAREIT	National Association of Real Estate Investment Trusts
NS	Profitability
NSW	New South Wales
NT$	Taiwan Dollar
NTA	Net Tangible Asset
Off	Office
OR	Ordinal Regression
PCA	Property Council of Australia
PD	Property Diversity
PF	Property Fund
PIR	Property Investment Research

PSF	Property Securities Funds
RBA	Reserve Bank of Australia
RBS	Radial Basis Function
REAT	Real Estate Asset Trust
REIT	Real Estate Investment Trust
REMIC	Real Estate Investment Mortgage Conduit
Ret	Retail
RICS	Royal Institution of Chartered Surveyors
RM	Malaysian Ringgit
RTC	Resolution Trust Administration
S$	Singapore Dollar
S & P	Standard and Poor's
SIZELN	Log of Issued Amount
SPV	Special Purpose Vehicle
SS	Stapled Security
TA	Natural Log of 3-Year Average of Total Assets of LPT
TEGoVA	The European Group of Valuers' Association
THB	Thailand Baht
UK	United Kingdom
US$	United States of America Dollar
USA	United States of America
VA	Veteran Administration
WALE	Weighted Average Lease Expiry Profile
WBS	Whole-Business Securitisation
WOT	Westpac Office Trust

List of Publications and Conference Paper

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Chikolwa, B., 2008, Assessment of Property Risk in Australian Commercial Mortgage-Backed Securities, Pacific Rim Property Research Journal, vol. 14, no. 1, pp. 3 - 26.

Chikolwa, B., 2007, Development of Australian Commercial Mortgage-Backed Securities, Pacific Rim Property Research Journal, vol. 13, no. 4, pp. 398 - 422.

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Executive Summary

According to the Reserve Bank of Australia (2006) the increased supply of Commercial Mortgage-Backed Securities (CMBS), with a range of subordination, has broadened the investor base in real estate debt markets and reduced the commercial property sector's dependence on bank financing The CMBS market has been one of the most dynamic and fastest-growing sectors in the capital markets, for a market which was virtually non-existent prior to 1990. The global CMBS market issuance which stood at AU$5.1 billion (US$4 billion)[1] in 1990 had grown to AU$380 billion (US$299 billion) by the end of 2006. In Australia, a total of over 60 CMBSs with nearly 180 tranches totalling over AU$17.4 billion had been issued to December 2006 from when they were first introduced in 1999.

To date few studies have been done on Australian CMBSs outside the credit rating agency circles. These studies are predominantly practitioner focused (Jones Lang LaSalle 2001; Richardson 2003; Roche 2000, 2002). O'Sullivan (1998) and Simonovski (2003) are the only academic studies on CMBSs. As such, this thesis examines issues relating to the development of Australian CMBSs and quantitatively and qualitatively analyses the structuring of Australian CMBSs.

In assessing the growth of the Australian CMBS market, an interpretive historical approach (Baumgarter & Hensley 2005) is adopted to provide a cogent review and explanation of features of international and Australian CMBSs. This helps to understand the changing nature of the market and provides better understanding of the present and suggests possible future directions.

The Australian CMBS market is matured in comparison with the larger US and EU CMBS markets as seen by the diversity of asset classes backing the issues and transaction types, tightening spreads, and record issuance volumes. High property market transparency (Jones Lang LaSalle 2006b) and predominance of Listed Property Trusts (LPT) as CMBS issuers (Standard & Poor's 2005b), who legally have to report

[1] For ease of comparison, the interbank exchange rates of US$1=AU$1.27 and EUR€1=AU$1.67 as at December 31, 2006 have been used.

their activities and underlying collateral performance to regulatory regimes such as Australian Stock Exchange (ASX)/Australian Securities and Investment Commission (ASIC) and their equity partners, have contributed to the success of the Australian CMBS market. Furthermore, the positive commercial real estate market outlook should support future CMBS issuance, with LPTs continuing their dominance as issuers.

In investigating property risk assessment in Australian CMBSs, all the CMBSs issued over a six year period of 2000 to 2005 were obtained from Standard and Poor's presale reports as found in their Ratings Direct database to identify and review how property risk factors were addressed in all issues and within specific property asset classes following the delineation of property risk by Adair and Hutchinson (2005).

Adequate assessment of property risk and its reporting is critical to the success of CMBS issues. The proposed framework shows that assessing and reporting property risk in Australian CMBSs, which are primarily backed by direct property assets, under the headings of investment quality risk, covenant strength risk, and depreciation and obsolescence risk can easily be done. The proposed framework should prove useful to rating agencies, bond issuers and institutional investors. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBSs. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

The ultimate goal of structuring CMBS transactions is to obtain a high credit rating as this has an impact on the yield obtainable and the success of the issue. The credit rating process involves highly subjective assessment of both qualitative and quantitative factors of a particular company as well as pertinent industry level or market level variables (Huang et al. 2004), with the final rating assigned by a credit committee via voting (Kwon et al. 1997). As such, credit rating agencies state that researchers cannot replicate their ratings quantitatively since their ratings reflect each agency's opinion about an issue's potential default risk and relies heavily on a committee's analysis of the issuer's ability and willingness to repay its debt. However, researchers have replicated bond ratings on the premise that financial ratios contain a large amount of information about a company's credit risk.

In this study, quantitative analysis of determinants of CMBS credit ratings issued by Standard and Poor's from 2000 – 2006 using ANNs and OR and qualitative analysis of factors considered necessary to obtain a high credit rating and pricing issues necessary for the success of an issue through mail surveys of arrangers and issuers are undertaken.

Of the quantitative variables propagated by credit rating agencies as being important to CMBS rating, only loan-to-value ratio (LTV) is found to be statistically significant, with the other variables being statistically insignificant using OR. This leads to the conclusion that statistical approaches used in corporate bond rating studies have limited replication capabilities in CMBS rating and that the endogeneity arguments raise significant questions about LTV and debt service coverage ratio (DSCR) as convenient, short-cut measures of CMBS default risk.

However, ANNs do offer promising predictive results and can be used to facilitate implementation of survey-based CMBS rating systems. This should contribute to making the CMBS rating methodology become more explicit which is advantageous in that both CMBS investors and issuers are provided with greater information and faith in the investment. ANN results show that 62.0% of CMBS rating is attributable to LTV (38.2%) and DSCR (23.6%); supporting earlier studies which have listed the two as being the most important variables in CMBS rating. The other variables' contributions are: CMBS issue size (10.1%), CMBS tenure (6.7%), geographical diversity (13.5%) and property diversity (7.9%) respectively. The methodology used to obtain these results is validated when applied to predict LPT bond ratings. Both OR and ANN produce provide robust alternatives to rating LPT bonds, with no significant differences in results between the full models of the two methods.

Qualitative analysis of surveys on arrangers and issuers provides insights into structuring issues they consider necessary to obtain a high credit rating and pricing issues necessary for the success of an issue. Rating of issues was found to be the main reason why investors invest in CMBSs and provision of funds at attractive rates as the main motivation behind CMBS issuance. Furthermore, asset quality was found to be the most important factor necessary to obtain a high credit rating supporting the view by

Henderson and ING Barings (1997) that assets backing securitisation are its fundamental credit strength.

In addition, analyses of the surveys reveal the following:

- The choice of which debt funding option to use depends on market conditions.
- Credit tranching, over-collateralisation and cross-collateralisation are the main forms of credit enhancement in use.
- On average, the AAA note tranche needs to be above AU$100 million and have 60 - 85% subordination for the CMBS issue to be economically viable.
- Structuring costs range between 0.1% – 1% of issue size and structuring duration ranges from 4 – 9 months.
- Preferred refinancing options are further capital market issues and bank debt.
- Pricing CMBSs is greatly influenced by factors in the broader capital markets. For instance, the market had literary shut down as a result of the “credit crunch” caused by the meltdown in the US sub-prime mortgage market.

These findings can be useful to issuers as a guide on the cost of going to the bond market to raise capital, which can be useful in comparing with other sources of funds.

The findings of this thesis address crucial research priorities of the property industry as CMBSs are seen as a major commercial real estate debt instrument. By looking at how property risk can be assessed and reported in a more systematic way, and investigating quantitative and qualitative factors considered in structuring CMBSs, investor confidence can be increased through the increased body of knowledge. Several published refereed journal articles in Appendix C further validate the stature and significance of this thesis.

It is evident that the property research in this thesis can lead aid in the revitalisation of the Australian CMBS market after the “shut down” caused by the melt-down in the US sub-prime mortgage market and can also be used to set up property-backed CMBSs in emerging countries where the CMBS market is immature or non-existent.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Bonds provide an important mechanism by which firms obtain new funds to finance new and continuing activities and projects. Bond issuance has been recognised by Listed Property Trusts (LPTs) as an important debt funding tool. Newell (2007a) and PIR (PCA/IPD 2007a) show the growth in debt levels of LPTs from only 15% in 1997 to 36% as at December 2006. Debt funding has been through direct bank borrowings and issuance of commercial mortgage-backed securities (CMBS) and unsecured bonds. For the period 1999 - 2006, bonds[2] worth a total of AU$10.5 billion were issued by LPTs (Chikolwa 2008; Property Council Australia 2007). In contrast, the Connect 4 Company Prospectuses database shows that LPTs raised AU$18.2 billion in equity raisings, excluding initial price offerings (IPOs). Chikolwa (2007a) also shows that LPTs issued CMBSs worth AU$9.3 billion over the same period.

In Australia, bond ratings are assigned by Standard and Poor's (S & P), Moody's Investors Service and Fitch Ratings. In this study, data on CMBS credit ratings is obtained from S & P, as it is the most widely used rating agency in Australia and publishes its CMBS credit ratings in the *Property Australia* magazine. The ratings inform the public of the likelihood of an investor to receive the promised principal and interest payments associated with the bond issue (Shin & Han 2001). The assigned ratings are important due to the implications they contain regarding the bond issue. Market yields correspond to bond ratings, which indicate an association between rating and risk. For instance, the success of an issue is dependent on obtaining a lower yield which is also influenced by high credit quality (Alles 2000; Kose et al. 2003). Issues of proprietorship have resulted in the methodology of rating mostly being shrouded in mystery. The methods and input variables used in rating are not fully disclosed to the public (Altman & Rijken 2006; Shin & Han 2001). As such, studies of the rating process are of interest not only to bond holders but also to investors.

[2] This excludes commercial mortgage-backed securities.

The credit rating process involves highly subjective assessment of both qualitative and quantitative factors of a particular company as well as pertinent industry level or market level variables (Huang et al. 2004) with the final rating assigned by a credit committee via voting (Kwon et al. 1997). Bond rating agencies assert that researchers cannot replicate their ratings quantitatively (Kim 2005) as they are the agency's opinion about an issue's potential default risk and that they rely heavily on a committee's analysis of the issuer's ability and willingness to repay its debt. However, researchers have still gone ahead and replicated bond ratings on the premise that the financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004).

The primary reference for modelling bond ratings which has been utilised directly or with minor variations is the Kaplan and Urwitz (KU) (1979) model. The KU model uses financial ratios relating to leverage, coverage, liquidity, profitability, and size. Kamstra et al. (2001) state that financial variables are able to explain about two-thirds of a company's bond rating. Traditionally statistical techniques such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models and more recently artificial neural networks (ANN) have been used to capture and model the expertise of the bond rating process.

Maher and Sen (1997) show the following as reasons why predictability of credit rating is useful:

- It provides a firm some insight into the cost of going to the bond market to raise capital, which can be useful in comparing with other sources of funds;
- It can help investors decide where they want to place their money;
- It can provide a modified form of implicit evaluation of the firm in addition to the explicit evaluation of the bond issue; and
- It can provide an insight into factors useful in understanding the value of the firm.

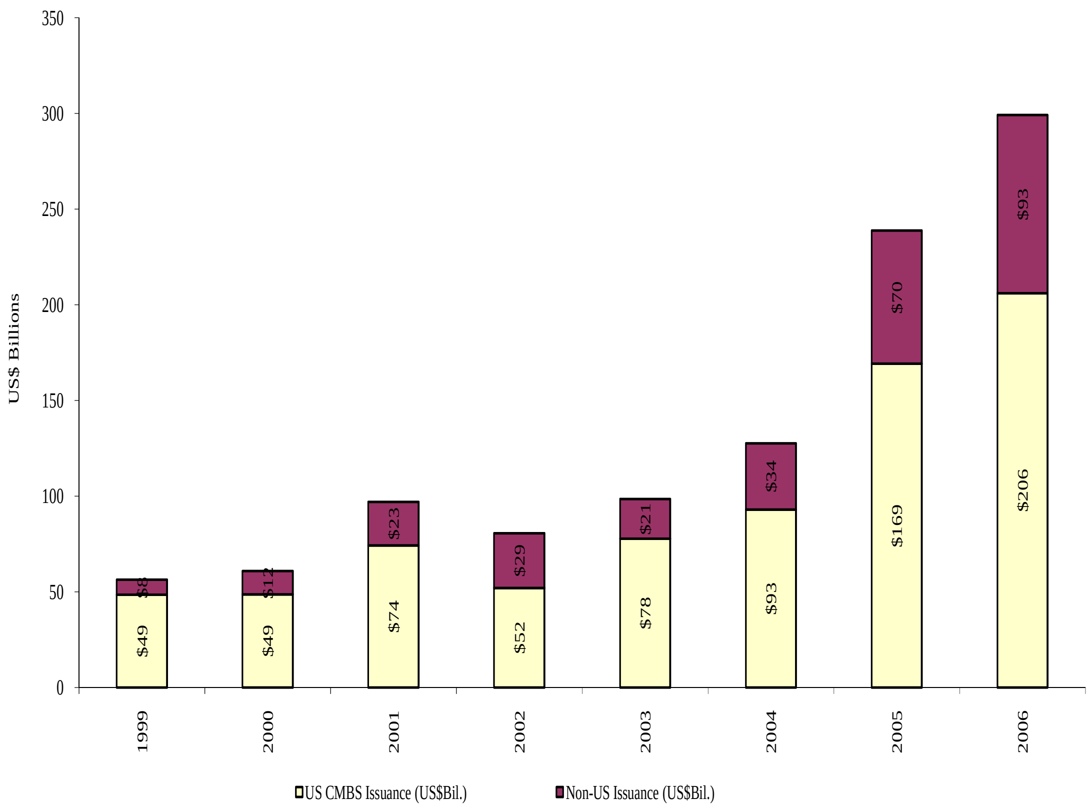
Furthermore, security analysts and investors can use these ratings as the primary source of obtaining information about the quality and marketability of various issues and assess also market risk premium attached to the bonds while investment bankers use the ratings for determining commission rates on undertakings (Kim 2005).

The following sections present an introduction to the development of Australian CMBSs as an investment and financing option and also factors considered in structuring CMBSs.

1.1.1 Development of the Australian CMBS Market

The CMBS market has been one of the most dynamic and fastest-growing sectors in the capital markets for a market which was virtually non-existent prior to 1990. The global CMBS market issuance which stood at AU$5.1 billion (US$4 billion) in 1990 had grown to AU$380 billion (US$299 billion) by the end of 2006 (Figure 1.1).

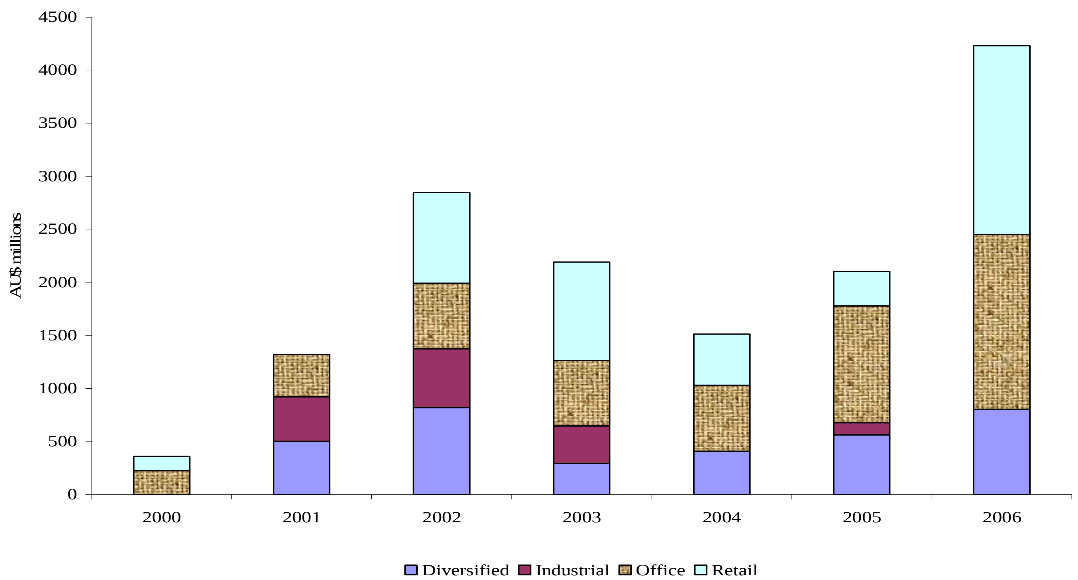
Figure 1.1: CMBS Global Issuance (1999 - 2006)



Source: Commercial Mortgage Alert (2007)

The US has been the market leader in terms of issuance volumes and diversity of asset classes backing the issues, with other regions replicating the US CMBS model to suit their local needs. In Australia, the description of CMBS has been expanded and accepted in the market to include a form of securitisation backed by direct property assets (Jones Lang LaSalle 2001), in addition to the traditional definition of the securitisation of commercial mortgages (Jacob and Fabozzi, 2003). The market has undergone significant development since the first transactions came to the market in 1999, with a range of transaction types and issuers now accessing the market. The first CMBSs in Australia were done by Leda Holdings in 1999, followed by the Longreach/Qantas head office and the David Jones stores securitisations in 2000. As at December 2006, a total of over 60 CMBSs with nearly 180 tranches totalling over AU$17.4 billion had been issued, excluding credit lease transactions and small ticket transactions (Figure 1.2). Appendix A shows AAA-rated CMBSs issued between 2000 and 2006, representing 78% of total issuance.

Figure 1.2: Australian CMBS Issuance by Sector(2000 - 2006)



Source: Author's compilation from Standard and Poor's presale reports

Over 2000 - 2006, diversified property backed issues[3] had the most tranches at 31%, followed by retail property backed issues at 28% and office at 23%. The least number of tranches were in the industrial property backed issues at 18%. This is shown in Table 1.1.

[3] These are property portfolios composed of different property types.

Table 1.1: Number of Tranches in Australian CMBS Issues (2000 - 2006)

	2000	2001	2002	2003	2004	2005	2006	2000-2006	% of Total
Diversified	1	2	11	7	7	14	13	55	31%
Industrial	4	3	6	12	4	3	0	32	18%
Office	0	3	4	5	9	10	11	42	23%
Retail	0	0	15	9	0	8	18	50	28%
Total	5	8	36	33	20	35	42	179	100%

Source: Author's compilation from Standard and Poor's presale reports

The growth of the CMBS market as a funding source and as an investment option is attributable to its advantages of lower pricing, improved liquidity, diversification of lenders, non-recourse to the parent company, release of value while retaining future growth potential, and off-balance sheet financing in comparison to bank financing. Jones Lang LaSalle (2001) illustrated the potential of CMBSs being a cheaper and alternative debt financing option for companies with property exposure. They further added that CMBSs offered investors advantages of insolvency remoteness, greater diversification, and greater transparency. Roche (2000), Blundell (2001) and Morrison (2001) also stated the advantages of CMBS over traditional bank financing as cost effectiveness, flexible arrangement, and longer repayment timeframes that closely match the long-term nature of property investment. The Reserve Bank of Australia (2006) also noted that increased supply of CMBS, with a range of subordination, has broadened the investor base in real estate debt markets and reduced the commercial property sector's dependence on bank financing.

Table 1.2 presents an overview of the Australian, US and EU CMBS markets. Further details of these markets are presented in Chapter 3.

Table 1.2: Overview of the CMBS Market in Australia, US and EU

Feature	Australia	US	EU
Market Size:	• AU$4.9 billion worth issued in 2006; 7% of ABS market. • 65 issues with over 180 tranches, worth over AU$17.4 billion were issued from 1999 to 2006	• AU$261 billion ($US$206 billion) issued in 2006; around 40% of ABS market. • AU$1257 billion (US$990.7 billion) issued from 1990-2006.	• 80 transactions worth AU$108 billion (€64.75 billion) in 2006. • More than AU$129 billion (€77 billion) was raised from 124 transactions between 1997 and 2004.
Underlying Collateral:	• Issuance backed by various sectors between 2000 and 2006: office 36% (AU$5.2 billion), retail 31% (AU$4.5 billion), diversified 23% (AU$3.4 billion) and industrial 10% (AU$1.4 billion).	• Retail and office backed issues dominant at 25% each in 2006.	• Office 31%, retail 28% and multi-family 23% in 2006.
Rating Tranche:	• 67% in AAA category by 2006; lower B-class tranches becoming common.	• Well matured market with A-rated and B-rated notes issued.	• 60% in AAA category; AU$7.5 billion (€4.5 billion) worth of non-investment notes by 2005.
Interest Type:	• 68% floating rate notes and 32% fixed rate notes in 2005. • 90% floating rate notes and 10% fixed rate notes in 2006.	• 81% floating rate notes and 12% fixed rate notes in 2006.	• 89% floating rate notes and 11% fixed rate notes between 2000 and April 2006.
Tranche Distribution:	• 95% single-borrower transactions • Only 1 conduit transaction by end of 2006.	• 88% conduit/fusion transactions and 12% large loans in 2006.	• 50% conduit/fusion transactions and 50% single-borrower transactions in 2006.
Spread Trends:	• AAA 5-year spreads at 20-25bp over BBSW and BBB 5-year spreads at 60-95bp in 2005. • AAA 5-year spreads 20bp wider and BBB 5-year spreads 60bp wider in 2002.	• Downward trend; average 10-year AAA conduit spreads at 30bp in 2006, a drop from 53bp in 2001.	• Spreads tightened by approximately 60% in the last three quarters of 2004. • AAA and BBB spreads narrowed from 160 bp to only 58 bp in 2005: a 64% reduction.
Performance:	• 15% credit rating upgrades, 14% downgrades and 71% affirmations in 2006.	• 36% credit rating upgrades, 1% downgrades and 63% affirmations in 2006.	• 7.6% credit rating upgrades (highest of any ABS sub-sector; average for ABS 4.5%) and 4.8% downgrades in 2004.
Others features:	• Secured mortgage structures used in all transactions. • Typically 3-5 year note tenure. • Average deal size of AU$400 million for new issues in 2006; two large issues worth AU$1 billion and AU$900 million in the last two years.	• True-sale structures dominate. • Typically 5-10 year note tenure. • Average conduit/fusion deal size of AU$3 billion (US$2.4 billion) in 2006, up from AU$ 2.7 billion (US$2.1 billion) in 2001.	• 90% synthetic and 10% true-sale structures in 2004. • UK traditionally the dominant jurisdiction, accounting for 74% in 2004; Germany is rapidly catching up, with multifamily deals making up 23% of all CMBS and 29% of conduit deals in 2006.

A cogent review and explanation of features of international and Australian CMBSs helps to understand the changing nature of the market. Using the historical approach, a researcher endeavours to record and understand events of the past. In turn, interpretations of recorded history hold to provide better understanding of the present and suggest possible future directions (Baumgarter & Hensley 2005). As such, the evolution of Australian CMBS is analysed and compared to that of the US and EU. Detailed research on the CMBS market structure and issue details add to its promotion as major commercial debt fund instrument.

1.1.2 Structuring Australian CMBSs

The ultimate goal of structuring CMBS transactions is to obtain a high credit rating as this has an impact on the yield obtainable and the success of the issue. Credit rating agencies recognise the use of both quantitative and qualitative techniques in arriving at their CMBS credit ratings (Fitch Ratings 2005c; Moody's Investor Service 2001a). Further, some rating agencies and some researchers have emphasized the importance of subjective judgement in the bond rating process and criticized the use of simple statistical models and other models derived from artificial intelligence to predict credit ratings, although they agree that such analysis provide a basic ground for judgement in general (Huang et al. 2004).

Qualitative judgement, which includes accounting quality, operating efficiency, financial flexibility, industry risk, and market position, is still difficult to measure. However, other researchers like Kim (2005) contend that most of these qualitative factors are likely to be reflected in quantifiable data such as financial and non-financial variables, and could be assessed indirectly from analysing these quantifiable data. Literature on bond rating prediction has demonstrated that statistical models and artificial intelligence models (mainly ANNs) achieved remarkably good prediction performance and largely captured the characteristics of the bond rating process.

To obtain a deeper understanding of factors considered in structuring CMBSs, a triangulation approach is adopted in this thesis. Triangulation is broadly defined by Denzin (1978 :291) as “the combination of methodologies in the study of the same phenomenon". Levy and Henry (2003) contend that a growing number of academics are now recognising the advantages of integrating both qualitative and quantitative research methods by way of triangulation. They further quote Kummerow (2000) who states:

> *"My personal view is that qualitative and quantitative methods are complementary and that methodological mutual respect is as valuable as racial or religious tolerance. Not only are diverse methods interesting in themselves, combining methods may lead to greater understanding and better outcomes both in research and practice. Most real-world decisions would be improved by information from both qualitative and quantitative research".*

In support of triangulation, Gallimore and McAllistair (2004; 2005) state that judgemental intervention is often a necessary and desirable element of the forecasting process and that subjectivity is intrinsic to the application of econometric methods.

In this study, quantitative analysis of determinants of CMBS credit ratings using ANNs and ordinal regressions (OR) and qualitative analysis of factors considered necessary to obtain a high credit rating and pricing issues necessary for the success of an issue through mail surveys of arrangers and issuers are undertaken. Arrangers are defined as investment bankers responsible for structuring CMBSs. Issuers or originators are commercial property owners seeking to use their properties as security for structured financing via CMBS issuance.

1.2 OBJECTIVES OF THE STUDY

The previous segments have demonstrated the significance of CMBSs as a funding and investment vehicle internationally and in Australia. A background of how researchers have replicated corporate bond ratings has also been presented. This study endeavours to show the importance of Australian CMBSs as a commercial property debt funding instrument and to examine both quantitatively and qualitatively how Australian CMBSs are structured.

As such, the objectives of this thesis are to:

- Retrace the rapid growth of the Australian CMBS market and compare it with that of US and the EU; particularly focussing on market structure and issue details.

- Investigate how property risk assessed in Australian CMBSs over 2000 - 2005 can be reported in a more concise and systematic approach.
- Investigate the use of ANN as a tool for predicting credit ratings of Australian CMBSs. Furthermore, to compare the predictive power of ANN models and OR models.
- To investigate structuring issues considered necessary to obtain a high CMBS credit rating and pricing issues necessary for the success of a CMBS issue.

The findings of this thesis address crucial research priorities of the property industry and are expected to have a significant contribution to the body of knowledge on CMBSs in Australia and internationally.

1.3 ORGANISATION OF THE THESIS

This thesis examines the development and structuring of CMBSs in Australia. As such, two themes, that is the development of the CMBS market and factors considered in structuring CMBSs, are the focus of this thesis. Each theme encompasses complete segments of introduction, literature review, research methodology, analysis and findings, conclusion and future research of each study. Each theme is structured in a way that not only forms a complete extensive study for a particular CMBS issue, but is also an integrated segment of the entire thesis.

The first two common chapters (Chapters 1 and 2) lay down the foundation and research significance for the extensive analysis of the two CMBS research themes. Chapters 3 and 4 are devoted to the development of the CMBS market, whilst Chapters 5 to 8 are for structuring CMBSs, respectively. The last chapter concludes the overall findings and property investment and financing contributions of this thesis. Several sections of this thesis have been published/presented in refereed property journals and international conferences. These published and presented research papers are found in Appendix C.

The chapter-by-chapter organisation of this thesis is as follows. Chapter 1 presents the background of the development and structuring of CMBS. Chapter 2 provides an introduction to the Australian commercial property market, in particular its structure and performance and the available property investment and funding vehicles.

Chapter 3 provides an overview of commercial mortgage-backed securities, in particular its significance as a funding source not only in Australia but globally as well. Chapter 4 outlines six case studies of Australian CMBSs to signify how the market has evolved and to show the diversity of the CMBS issues.

Assessment of property risk in Australian CMBSs is presented in Chapter 5. Chapter 6 empirically tests the determinants of CMBS credit ratings, with similar tests done on LPT bonds in Chapter 7 to validate the methodology.

Chapter 8 presents the data, results and analysis of surveys of issuers and arrangers of CMBSs. The final chapter of this thesis, Chapter 9, summarises the conclusions and property investment and financing implications addressed in the previous chapters. Summaries of the overall contributions of this thesis, as well as limitations and future research are also presented in Chapter 9.

CHAPTER 2

AN INTRODUCTION TO THE AUSTRALIAN COMMERCIAL PROPERTY MARKET

2.1 BACKGROUND

The global commercial property market has been estimated to be close to AU$12.7 trillion (US$10 trillion) and accounts for approximately 15% of global equity and 24% of global bond markets (RREEF 2007a; 2007b). Accounting for 2% of the world's commercial property markets, Australia is the 11th largest commercial property market in the world (Hughes & Arissen 2005; UBS Real Estate Research 2006), with property fund managers in Australia having AU$357 billion in total assets as at December 2006 (PIR 2006).

This chapter highlights the significance of commercial property investment in Australia as an asset class for institutional investors. Particular attention is given to the size of the market and its performance and the available property investment and financing vehicles. This sets context for CMBSs as a commercial debt funding/investment instrument since Australian CMBSs are primarily a securitisation of direct property assets. CMBSs are analogous to straight corporate bonds which derive their value from the ability of the underlying asset to generate sufficient revenue to support debt payments (Maxam & Fisher 2001). Therefore, the performance of the direct property market has an impact on the ability to meet coupon payments on CMBS issues, to "tap" issues, and to refinance maturing CMBSs.

Ghosh et al. (1997) conclude that financing decisions by REIT managers are influenced by their perception of the expected changes in the overall market, especially the real estate sector. As such, a review of the available commercial property financing and investment vehicles is important to show the stature of CMBSs in relation to other instruments and to show is growth potential.

2.2 AUSTRALIAN COMMERCIAL PROPERTY MARKET STRUCTURE AND PERFORMANCE

Australian commercial real estate is a relatively small asset class in comparison with other mature markets such as the USA and EU. The USA commercial real estate market has been estimated at AU$6 trillion (US$4.7 trillion), whereas estimates for the EU commercial real estate market is at AU$4.1 trillion (US$3.2 trillion) (RREEF 2007a). Higgins (2007) estimates a value of AU$449 billion of which investment grade 'core' (retail, office and industrial) assets accounted for AU$232 billion as at December 2006 (Table 2.1). Shown in Table 2.1 is the large involvement of institutional investors in the Australian 'core' commercial property market at 72% of market coverage.

Table 2.1: Summary of the Australian Property Investment Market

Sector	**Property investment market size total value (AU$bn)**	**Institutionally owned property total value (AU$bn)**	**Market coverage by institutional investors**
Core Property Sector			
Office	$92	$64	70%
Retail	$87	$83	95%
Industrial	$52	$20	39%
Sub-Total	**$232**	**$167**	**72%**
Non-core Property Sector	$217	$11	5%
Total	**$449**	**$178**	**40%**

Source: Higgins (2007)

Growth in the Australian commercial property markets has been underpinned by strong economic growth, reflected in Australia being listed twelfth on the World Competitiveness Scorecard (IMD 2007) and ninetieth on the Global Competitiveness Index (World Economic Forum 2007) in 2007. Real GDP is forecast to grow by 3.75% in 2007 - 2008, up from 2.5% in 2006 - 2007 (Commonwealth of Australia 2007). This has resulted in investors in indirect property being rewarded with strong returns with LPTs outperforming shares and bonds over a ten-year period to Q3:2007 (Table 2.2). Details are discussed under subsequent sub-headings for each asset class.

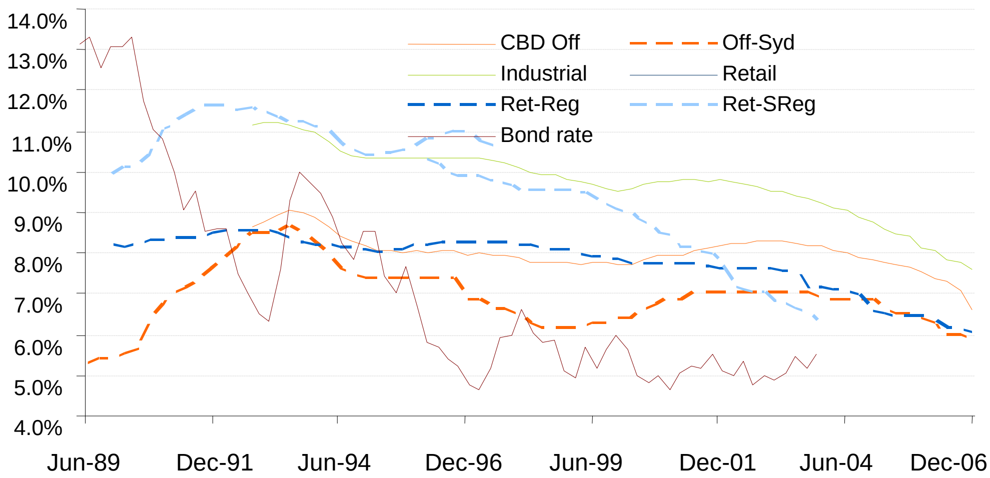
Table 2.2: Asset Class Performance: Australia: Q3:2007

Asset Class	Average Annual Return (%) 1Y	3Y	5Y	10Y
Direct property	17.3%	15.4%	13.6%	12.0%
Office	20.0%	13.9%	11.1%	10.5%
Retail	15.5%	16.9%	16.0%	13.3%
Industrial	13.0%	13.0%	13.1%	13.2%
LPTs	18.4%	19.7%	18.6%	15.2%
Office	18.9%	17.0%	15.4%	12.2%
Retail	17.6%	20.1%	18.8%	16.4%
Industrial	31.2%	26.9%	25.4%	19.0%
Shares	33.6%	26.4%	19.6%	13.1%
Bonds	3.1%	5.9%	5.6%	5.9%

Source: PCA/IPD (2007b), UBS (2007)

These strong returns have reinforced the importance of real estate as an asset class in its own right leading to sustained demand for real estate as evidenced by continued yield compression. Figure 2.1 shows yield trends in retail, office and industrial sectors from 1991 to 2006. These trends are expected to continue due to the limited number of 'investment-grade' properties (Murdoch 2004) and the large amounts of funds being allocated to property investment mainly by the superannuation funds (Newell 2006b). According to PIR (2007a) a 10% allocation to property translates to an investment of over AU$101 billion as of December 2006. Newell (2006b) estimated an average 10% allocation to property (either direct or indirect) by superannuation funds in 2005.

Figure 2.1: Australian Direct Property Markets Yields



Source: JLL, and CFS Research (2006).

The large amounts of funds being invested in property are not only particular to Australia but a global trend, with RREEF (2007b) estimating close to AU$762 billion (US$600 billion) invested globally in real estate during 2006, up 20% on the previous year. RREEF attribute this to strong investor appetite, strong rent growth prospects and tightening cap rate spreads to bond yields. Jones Lang LaSalle (2007c) found that 87% of Australian investors are seeking to increase their exposure to direct property (with only 4% seeking to sell), compared with 50% seeking to increase exposure to LPTs (with 15% seeking to sell).

2.2.1 Office Market

Commercial office stock in Australia totalled over 26.4 million square metres, with a market value estimate of AU$107.3 billion as at January 2007 (CB Richard Ellis 2007a). This comprises both CBD (70.3%) and non-CBD (29.7%) office stock. The 2006 office stock represents a 28.5% increase over 1990-2006. The largest office markets located in the CBDs of the five main Australian cities (Adelaide, Brisbane, Melbourne, Perth and Sydney) have over 200 prime buildings totalling 5.5 million square metres, accounting for 68.6% of Australian's total office stock (PCA/IPD 2007a). The remainder is located in 14 secondary markets. A profile of the Australian office markets as of July 2007 is shown in Table 2.3.

Table 2.3: Australian Office Markets Profile: July 2007

Office Market	Total Stock (m^2)	Vacancy Rate	Percentage of Total Australian Office Stock
Australian CBD Office	**14,439,509**	**4.3%**	**70.25%**
Sydney CBD	4,762,478	5.6%	23.17%
Melbourne CBD	3,629,350	5.9%	17.67%
Brisbane CBD	1,744,698	1.2%	8.49%
Canberra CBD	1,726,425	1.3%	8.40%
Perth CBD	1,279,840	0.7%	6.23%
Adelaide CBD	959,793	7.6%	4.67%
Hobart CBD	336,925	1.7%	1.64%
Australian non-CBD Office	**6,115,146**	**6.0%**	**29.75%**
North Sydney	803,502	8.3%	3.91%
Crows Nest/St. Leonards	356,992	10.2%	1.74%
Chatswood	298,721	7.1%	1.45%
Parramatta	608,826	8.2%	2.96%
North Ryde	553,474	7.9%	2.69%
Newcastle	218,655	7.0%	1.06%
St Kilda Road	761,931	8.6%	3.71%
Southbank	368,905	4.4%	1.79%
East Melbourne	172,919	5.5%	0.84%
Gold Coast	370,438	5.0%	1.80%
Brisbane (near city)	822,702	1.3%	4.00%
Adelaide (frame)	224,032	4.4%	1.09%
Adelaide (fringe)	192,968	1.4%	0.94%
West Perth	361,081	0.4%	1.76%
Australia Office	**20,554,655**	**4.8%**	**100%**

Source: PCA (2007)

Within Asia Pacific, Australia surpasses other countries in the region, with modern office buildings in planned cities complementing a low risk business environment that provides access to a acknowledgeable and creative pool of skilled and multi-lingual labour (Axiss Australia 2005). Table 2.4 presents some of the major Australian prime office buildings.

Table 2.4: Major Australian Prime Office Buildings

Floor Area (m^2)	Year Completed	City	Building Name
84,500	1986	Melbourne	Rialto, 505-535 Collins Street
82,750	1987	Sydney	Grosvenor Place, 205-235 George Street
77,950	1991	Melbourne	101 Collins Street
72,700	2000	Sydney	Citibank Centre, 2-26 Park Street
68,500	1978	Sydney	MLC Centre, 19-29 Martin Place
68,050	1991	Melbourne	The Stock Exchange Centre, 530 Collins Street
65,400	1991	Melbourne	The Tower, Melbourne Central, 350-360 Collins Street
64,850	1992	Sydney	Chifley Tower, 2 Chifley Square
64,100	1991	Melbourne	BHP Petroleum Plaza, 108-120 Collins Street
63,800	1993	Perth	Central Park, 152-158 St George Terrace
47,170	2003	Perth	Woodside Plaza, 240 St Georges Terrace

Growth in the Australian office markets has been underpinned by strong economic growth, with Access Economics (2007) predicting white collar employment growth to be above 1.5% to 2011.

Further, Australian office markets play a significant role for both national and international financial and business services with Sydney ranked 46 out a total of 50 cities in CB Richard Ellis' Global Market Rents Report of November 2006 (CB Richard Ellis 2006). Perth, Brisbane, Melbourne and Sydney also feature prominently among major Asia-Pacific cities in Jones Lang LaSalle's Asia Pacific Property Digest (Jones Lang LaSalle 2007a). Generally, office markets across Australia have performed well, with record sales activity and rental growth in Perth and Brisbane. Over AU$3 billion (sales above AU$5 million) in office property sales occurred in Sydney and Melbourne in 2006, with a national average of 306,000m^2 to be added to stock each year for the next five years. Strong office sales activity continued into the first quarter of 2007 with total sales reaching AU$846.9 million and average net face rents growing by 16.6% to AU$490/sq m. Net effective rentals increased by 21% from AU$324/sq m. to AU$391/sq m. (CB Richard Ellis 2007a).

Institutional investors have played a dominant role in commercial property investment, with a market coverage of 70% estimated at AU$64 billion in 2006 (Higgins 2007). Of the 3,982 properties valued at AU$223.4 billion in commercial property assets in 418 property funds in Australia, the 149 office property funds account for 357 properties valued at AU$25 billion. Table 2.5 provides details of the major office property investors in Australia.

Table 2.5: Major Office Property Investors: June 2007

Investor Type	Number of Properties	Portfolio Value (AU$bn)
Listed property trusts: office		
Investa[1]	34	$31.8
Macquarie Office	42	$6.2
Commonwealth Property	29	$3.5
ING Office	23	$3.2
Tishman Speyer	18	$1.6
Listed property trusts: diversified[2]		
Stockland	32	$4.3
Multiplex[1]	14	$2.5
General Property Trust	39	$1.8
Mirvac	18	$0.7
DB RREEF	6	$0.6
Unlisted property trusts		
GPT Wholesale Office Centre Fund	12	$2.2
Australian Prime Property Fund	10	$0.9

(1) Investa and Multiplex have since December 2007 been de-listed from the ASX following their acquisition by private equity consortiums led by Morgan Stanley and Brookfield Asset Management, respectively.

(2) Only contribution by office properties to diversified portfolio is shown.

In particular, the LPT sector is the major contributor to office property in Australia, having both substantial Australian and international office property portfolios. Major office LPTs include Macquarie Office (AU$6.2 billion in total property assets), as well as office property making major contributions to the leading diversified LPTs, including Stockland (AU$4.3 billion in office property from AU$13.7 billion in total property assets). Pension funds in Australia typically access office property via the unlisted property funds, including the unlisted office property funds by major institutional investors such as Investa, Multiplex, GPT and Lend Lease which have multi-billion dollar office property portfolios (Table 2.5). Property syndicates targeting smaller investors seeking direct office property investment have also been set up. These are predominantly backed by large single office buildings or diversified property portfolios. Some of the major players with specialised office funds are Cromwell Corporation Limited (5 funds with 6 properties worth AU$201.3 million) and Becton Investment Management Limited (8 funds with 11 properties worth AU$246.0 million).

Amongst the LPT sectors in Australia, the office LPTs accounted for 8% of the LPT market capitalisation as at December 2007 compared to retail LPTs (45%), industrial LPTs (11%) and diversified LPTs (36%) (UBS 2007). These office LPTs have adopted different office portfolio investment strategies, including 100% domestic office portfolios (Commonwealth Property), 100% international office portfolios (Tishman Speyer Office, Rubicon Europe, Rubicon America) and merged domestic/international office portfolios (ING Office Macquarie Office). Most of the international office LPTs (Tishman Speyer: 53.3%) tend to have higher debt levels in comparison to domestic office LPTs (Commonwealth Property: 26.1%).

To further reinforce the significance of office property in Australia, Table 2.1 presents the average annual returns for one, three, five and ten year holding periods for the various asset classes at Q3:2007. Direct office property was the best performer over the one-year period of all direct property sectors, but the lowest performer over the five-year and ten-year periods. Low returns were also recorded for the office LPTs in comparison to the retail and industrial LPTs over the five-year and ten-year periods. However, office LPT returns were still higher than those of shares and bonds over a ten-year period. Despite the low return in comparison to other property asset classes, the office sector still attracts large capital inflows on the backdrop of strong economic growth and has favourable current investor sentiment in the short-term and medium-term (Jones Lang LaSalle 2007b).

2.2.2 Retail Market

The retail sector makes an important contribution to the Australian economy, being the largest employment sector (14.4% contribution) and the seventh largest contributor to GDP (5.8% contribution) in 2006 (PricewaterhouseCoopers 2007). Australia's recent robust economic performance resulted in a 6.9% retail sales growth a year to June 2007, largely driven by income growth. Retail sales are further predicted to grow at 6.3% in 2008 (ANZ Banking Group 2007a, b).

Importantly, a diverse range of retail property types are available in Australia. For example, Sydney retail comprises over 5.0 million m^2, including shopping centres (68%), CBD retail (14%), bulky goods centres (15%) and retail strips (3%) (CB Richard Ellis 2007b). On a regional basis, the larger states of NSW (30%, including Sydney), Queensland (23%, including Brisbane) and Victoria (23%, including Melbourne) dominate the retail property landscape (UrbisJHD 2007). E-retailing has had minimal impact on retail patterns accounting for only 2 - 5% of retail sales in Australia (Ryder 2004), US (Worzala et al. 2002) and UK (Dixon & Marston 2002), further reinforcing the importance of these retail property types.

Institutional investors are major owners of retail property, with a market coverage of 95% (Higgins 2007). LPTs/syndicates have been progressively increasing purchases of retail property from 70% of all real property purchases over 2001 - 2004 (Burdekin and Snoswell, 2004) to over 85% of retail property purchases in 2005 (CBRE, 2006). LPTs and property funds accounted for only 30% of purchases over 1993-1996.

Table 2.6 provides details of the major retail property investors in Australia. Of the 3,982 properties valued at AU$223.4 billion in commercial property assets in 418 property funds in Australia, the 85 retail property funds account for 934 properties valued at AU$71.9 billion.

Table 2.6: Major Retail Property Investors: June 2007

Investor Type	Number of Properties	Portfolio Value (AU$bn)
Listed property trusts: retail		
Westfield	119	$43.1
Centro Properties	810	$26.6
CFS Gandel Retail	24	$6.4
Macquarie CountryWide	252	$5.4
Macquarie DDR	78	$2.6
Listed property trusts: diversified (1)		
General Property Trust	25	$4.1
Stockland	43	$4.3
Mirvac	18	$0.7
Unlisted property trusts		
Australian Prime Property Fund	11	$2.8
GPT Wholesale Shopping Centre Fund	8	$1.9
ING Retail Property Fund	18	$1.5
Colonial Direct Property Investment Fund	5	$0.8
Property syndicates		
Centro MCS(2)	105	$2.8

(1) Only contribution by retail properties to diversified portfolio is shown

(2) Includes 30 separate property syndicates as at 31 December 2006.

In particular, the LPT sector is the major contributor to retail property in Australia, having both substantial Australian and international retail property portfolios. One major retail LPTs is Westfield (AU$43.1 billion in total property assets), which is the largest LPT/REIT in the world. Retail property also makes major contributions to the leading diversified LPT property portfolios, e.g. General Property Trust (AU$4.1 billion in retail property from AU$15.7 billion in total property assets) and Stockland (AU$4.3 billion in retail property from AU$13.7 billion in total property assets). Pension funds in Australia typically access retail property via the unlisted property funds, including the unlisted retail property funds of major institutional investors such as GPT, Lend Lease and AMP which have multi-billion dollar retail property portfolios (Table 2.6). Smaller investors seeking direct retail property exposure are able to utilise property syndicates, with Centro MCS being the major retail property player in this property syndicates sector (Table 2.6).

Amongst the LPT sectors in Australia, retail LPTs figure prominently, accounting for 45% of the LPT market capitalisation as at December 2007 compared to office LPTs (8%), industrial LPTs (11%) and diversified LPTs (36%) (UBS 2007) These retail LPTs have adopted different retail portfolio investment strategies, including 100% domestic retail portfolios (CFS Gandel), 100% international retail portfolios (Macquarie DDR, APN European) and merged domestic/international retail portfolios (Westfield, Macquarie CountryWide). The higher gearing levels for retail LPTs (41.5%), compared to office LPTs (33.8%), industrial LPTs (35.6%) and diversified LPTs (32.6%) reflects the higher levels of international property in these retail LPTs (Newell & Peng 2007b). Higher gearing is used as a natural hedging strategy by LPTs with international property exposure (Tan Y.K. 2004a).

To further reinforce the significance of retail property in Australia, Table 2.2 presents the average annual returns for one, three, five and ten year holding periods for the various asset classes at Q3:2007. Direct retail property outperformed both the office and industrial property sectors, with retail LPTs being only outperformed by industrial LPTs over the five-year and ten-year periods. The share market, though, outperformed both the direct and indirect property markets a year to Q3:2007, with the bond market being outperformed by the direct property sector, LPTs, and shares. Newell and Peng (2007b) show that strong performance by retail property is not only particular to Australia but also in US and UK. Though the retail market has had strong performance, current investor sentiment for retail property in the short-term and medium-term is not as favourable as that for office property and industrial property (JLL, 2006b).

2.2.3 Industrial Market

Industrial property is an important property sector in Australia, with core industrial property estimated to account for AU$52 billion (22.4%) of Australia's core property assets of AU$232 billion (Higgins 2007) . With industrial property performance closely linked to economic performance, the strong GDP growth in Australia in recent years has seen enhanced stature and performance by industrial property. Australia's GDP grew by 4.3% a year to June 2007 driven by the global commodities boom with businesses reporting the highest capacity utilisation since the late 1980's. Real GDP is forecasted to grow by 3.75% in 2007-2008 (Commonwealth of Australia 2007). In 2007, the industrial sector was the second largest contributor to GDP contributing almost AU$98bn, 10%. However, the longer term trend is downwards (DTZ Australia 2007). As a result of this economic growth, Sydney industrial values increased by 10% - 15% per annum over ten years to June 2005 (JLL, 2005) and over AU$1.6 billion in industrial property sales occurred in 2005-2006; largely in Sydney (40%) and Melbourne (27%). In addition, 3.8M m^2 of industrial property stock become available in 2006 (CBRE, 2006).

In the 2005/2006 financial year, over AU$1.75 billion was invested in the industrial market, an increase of 18.8% on the 2004/2005 financial year. The growing disparity between limited supply and rising demand has resulted in yield compression. Over the year to June 2006, prime industrial yields tightened by around 35 basis points to range between 6.75% and 8.50% nationally (CBRE, 2006).

Industrial property has taken on increased importance in institutional property portfolios in recent years via a wide range of property investment vehicles; particularly listed property trusts and wholesale property funds. Table 2.7 provides details of the major industrial property investors in Australia, with over 1,250 industrial properties valued at over AU$17.9 billion in 68 property funds, including both sector-specific and diversified property portfolios (PIR, 2006 #655). Institutional investors are estimated to own approximately 39% of industrial property in Australia (Higgins 2007).

Table 2.7: Major Industrial Property Investors: June 2006

Investor Type	Portfolio Value (AU$m)
LPT: industrial	
Macquarie Goodman	$4,900
ING Industrial Trust	$2,398
Macquarie ProLogis Trust	$1,993
JF US Industrial Trust	$597
LPT: diversified(1)	
DB RREEF	$2,327
Stockland	$754
GPT	$365
Mirvac	$128
Valad	$126
Wholesale property funds: industrial	
APPF-Industrial	$258
Colonial FS Direct-Industrial	$196
Macquarie Goodman Wholesale Fund	$1,239
Macquarie Goodman Wholesale Fund	$800M
Wholesale property funds: diversified(1)	
AMP Australian Core Property	$307
AMP Property Income Fund	$223
Deutsche Wholesale Direct Property	$104
Colonial FS Private Property Syndicate	$101
ISPT Core Fund	$287
Property syndicates	
Australian Unity (3 funds)	$140
Becton	$132
Investa (2 funds)	$116
Unlisted property funds	
Westpac	$203
APN	$221

Source: Newell (2007b)

(1) Only contribution by industrial properties to diversified portfolio is shown

In particular, the LPT sector is the major contributor to industrial property investment in Australia, having over AU$13.7 billion in Australian and international industrial property assets (PIR, 2006 #655). Major industrial LPTs include Macquarie Goodman (AU$4.9 billion in total property assets) being the fourth largest LPT in Australia[4] and ING Industrial (AU$2.4 billion), as well as the 100% US industrial property LPTs (Macquarie ProLogis and JF US Industrial). Industrial property also makes major contributions to the leading diversified LPTs, including DB RREEF (AU$2.3 billion in industrial property from AU$7.2 billion in total property assets, representing 32% of portfolio) and Stockland (AU$754 million in industrial property from AU$7.2 billion in total property assets, representing 10% of portfolio).

Similarly, wholesale property funds have invested over AU$3.5 billion in Australian and international industrial property assets (Table 2.7), providing a major source of direct property exposure for superannuation funds in Australia. This industrial property exposure is achieved through sector-specific wholesale property funds (eg: Macquarie Goodman Wholesale Fund (AU$1.2 billion), APPF-Industrial (AU$258 million)) and diversified wholesale property funds (eg: AMP Australian Core Property (8% industrial), ISPT Core Fund (8% industrial) and AMP Property Income Fund (27% industrial). Macquarie Goodman have been particularly active, establishing two new wholesale industrial property funds (one Australian industrial property, one Hong Kong industrial property) in 2006 with total industrial property assets of over AU$2 billion. Smaller investors seeking direct industrial property exposure are able to utilise property syndicates and unlisted property funds (Table 2.7).

Over 1985 - 2005 in Australia, industrial property had been the best performed property sector in 48% of years, compared to retail property (33% of years) and office property (19% of years), as well as industrial property being the worst performed property sector in only 19% of years (see Table 2.8). Industrial property also outperformed shares in 52% of years over this 21-year period of 1985 - 2005 (IPD/PCA, 2006). Both direct industrial property and industrial LPTs delivered strong risk-adjusted returns over

[4] Largest US industrial REITs are Prologis (US$11.9 billion market cap; 4th largest US REIT) and AMB Property (US$4.2 billion) (NAREIT, 2006)

Q3:1995 - Q2:2006; being the best performed direct property and LPT sectors respectively (Newell 2007b).

Table 2.8: Industrial Property Performance Analysis: Q3:1995 - Q2:2006

Asset Class	Average Annual Return	Annual Risk	Sharpe Index[1]
Total property	10.87%	1.44%	3.70
Office	9.20%	1.32%	2.77 (3)
Retail	12.10%	2.25%	2.92 (2)
Industrial	13.68%	1.46%	5.60 (1)
LPTs	13.62%	7.92%	1.02
Office	11.09%	7.59%	0.73 (4)
Retail	14.75%	9.70%	0.95 (2)
Industrial	18.56%	11.18%	1.17 (1)
Diversified	13.11%	9.44%	0.80 (3)
Shares	12.87%	10.87%	0.68
Bonds	7.20%	4.28%	0.39

(1) Rank amongst property sectors and LPTs given in brackets

Source: Newell (2007b)

The future outlook for industrial property in Australia is positive, reflected in the strong economic outlook and the strong current investor sentiment for industrial property in both the short-term and medium-term; particularly for high-tech industrial and prime industrial property (Jones Lang LaSalle 2007b, c).

2.3 AUSTRALIAN COMMERCIAL PROPERTY INVESTMENT AND FINANCING VEHICLES

The Australian investment market was estimated to be around AU$6.1 trillion as at December 2006, with the Australian commercial property markets contribution at 5% (Higgins 2007). Details of this estimate are shown in Table 2.9

Table 2.9: Australian Investment Market as at December 2006

	Public Markets	**Private Markets**
Equity Assets	**Shares (AU$1,390 billion)** *-Listed Property Trusts (AU$136 billion)*	**Private Entities (AU$1,156 billion)** *-Direct Property & Unlisted Property (AU$69 Billion)*
Debt Assets	**Traded Debt Securities (AU$2,659 billion)** *-CMBS and Property Trust Bonds (AU$12 billion)*	**Bank Loans (AU$904 billion)** *-Whole Commercial Property Mortgages (AU$71 billion)*

Source: Higgins (2007)

The commercial property investment market is further split at 67% equity and 33% debt of institutional-grade commercial property assets. This is the opposite of USA commercial property market segmentation, which is split at around debt 70% and equity 30% (Mirvac 2006).

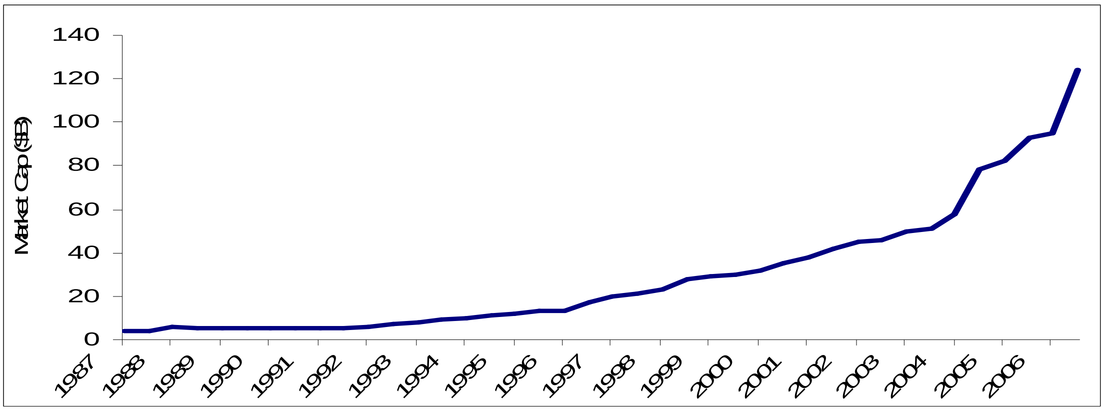
The following sections will briefly outline the characteristics of these main property investment and financing vehicles in Australia.

2.3.1 Listed Property Trusts

As at December 2006, the LPT sector had total assets of over AU$140 billion, comprising over 3,000 institutional-grade properties in diversified and sector-specific portfolios (PIR 2006). LPTs currently account for over AU$124 billion in market capitalisation, being the third largest sector on the stock market and representing over

10% of the total Australian stock market capitalisation, compared to only 5% of the total Australian stock market capitalisation in 2000 (UBS, 2007 #605).

Figure 2.2: Growth in LPT Market Capitalisation: 1987 – 2006



Source: Newell (2007a)

Figure 2.2 shows the growth in LPT market capitalisation since 1987. Significant growth has occurred since 1992, which has seen the LPT market capitalisation grow from AU$7 billion to its current level of over AU$140 billion. Currently, there are a range of LPTs, including diversified LPTs (36%), office LPTs (8%), retail LPTs (45%) and industrial LPTs (11%) (UBS 2007). Unlike US REITs, Australian LPTs do not have multifamily property in their portfolios.

Table 2.10 presents an overall profile of the leading diversified and sector-specific LPTs in the LPT sector as at December 2006. There are 32 LPTs in the top 300 companies on the Australia stock market, with 60 LPTs in total as at December 2006 (UBS, 2007 #605). The largest LPTs include Westfield (AU$36.98 billion), Stockland (AU$11.33 billion) and GPT (AU$11.43 billion), with some LPTs having in excess of 100 commercial properties in their portfolios (DB RREEF, Macquarie Goodman, Westfield, Macquarie CountryWide, and Stockland).

Currently, LPTs account for approximately 7% of institutional asset allocations and account for over 45% of all institutional-grade property in Australia. As Australia only accounts for 2% of the world's commercial property, this sees Australia as the most securitised property market in the world (Hughes and Arissen, 2005). Approximately, 70% of LPT stocks are held by the major institutional investors, with LPTs being highly liquid stocks, having an annual LPT turnover of over 85% of the total LPT market capitalisation in 2006; this compares with a turnover of only 45% in 1999.

Table 2.10: Leading LPTs as at December 2006

LPT	Market Capitalisation (AU$bn)	Number of Properties
Diversified		
GPT	$11.43	78
Stockland	$11.33	160
Mirvac	$5.43	60
DB RREEF	$5.06	176
Multiplex	$3.28	28
Office		
Investa Property	$3.83	34
Macquarie Office	$3.01	41
Commonwealth Property	$2.38	29
ING Office	$1.79	23
Retail		
Westfield	$36.98	128
Centro Properties	$7.42	62
CFS Retail Property	$4.88	24
Macquarie CountryWide	$2.57	250
Macquarie DDR	$1.20	71
Galileo Shopping America	$1.20	127
Industrial		
Macquarie Goodman	$12.61	752
ING Industrial	$2.20	60
Macquarie Prologis	$1.08	125

Source: UBS (2007), PIR (2006)

Private equity is becoming increasingly interested in the property investment market, driven by the secure nature of income return and potential capital growth of holding property for the medium to long term (DTZ Australia 2007). In Australia, three LPTs have recently been acquired by private equity consortiums including Morgan Stanley's purchase of Investa for AU$4.7 billion, Brookfield Asset Management's bid of AU$4.3

billion for Multiplex and Prologis AU$1.4 billion buyout of the Macquarie share of Macquarie Prologis. Investa and Multiplex has since been de-listed from the ASX.

LPTs have performed strongly compared to the other major asset classes over the last ten years, with LPT risk levels being significantly below stock market risk, reflecting the defensive characteristics of LPTs. Sector-specific LPTs have also typically outperformed the corresponding direct property sector.

Typically, LPTs are not considered to be highly geared at an average gearing of 36% as at December 2006, although these debt levels have increased significantly from 15% gearing in 1997(PIR 2007a). De Francesco (2007) show that LPT debt levels can be increased without taking on substantially more risk whilst enhancing returns. The yields for LPTs (currently 6.0%) make them attractive yield-focused investment alternatives to 10-year bonds, although there has been significant yield compression for LPTs in 2005-2006 (PIR 2007a). The LPT sector also trades at a significant premium to NTA; this is unlike most other securitised property markets and reflects the quality of LPT management.

LPT and stock market performance in Australia is correlated (r = .62 over 1985-2006) (IPD/PCA, 2007) and it has been shown that there is no long-term market integration between LPTs and the stock market (Peng, 2004; Wilson and Okunev, 1996, 1999; Wilson et al, 1998). This evidence of market segmentation suggests that there are diversification benefits from including LPTs in an investment portfolio, particularly in conditions of increased stock market volatility (Newell and Acheampong, 2001). Both diversified and sector-specific strategies are equally effective for LPT portfolio diversification (Newell and Tan, 2003). LPTs also show evidence of superior property selection and market timing (Peng, 2004). The establishment of an LPT futures market in August 2002 further enhanced the stature of LPTs, with institutions being able to use LPT futures as an effective risk management tool for hedging their LPT exposure (Newell and Tan, 2004a).

Overall, LPTs have been seen to be a world-class indirect property investment vehicle, offering a range of attractive investment features and access to quality commercial property portfolios for both institutional and general investors.

2.3.2 Property Securities Funds

Property securities funds (PSF) offer both retail and wholesale investors the opportunity to invest in a portfolio of property securities managed by professional fund managers, which allows the investor to achieve diversification across the spectrum of property securities (mainly LPTs) with reduced portfolio risk (Tan Y.K 2004). There are 128 funds with 116,621 investors and AU$39 billion in funds under management, comprising wholesale PSFs (AU$26 billion), retail PSFs (AU$9.2 billion) and property securities mandate (AU$3.7 billion) (PIR 2007a). These PSFs include value-added funds, as well as index-based funds (Vanguard), with AMP Capital (AU$6.3 billion) being the dominant PSF manager. Table 2.11 shows the top ten PSF managers, who account for 69% market share.

Table 2.11: Leading Property Securities Fund Managers: December 2006

Fund Manager	Total Assets (AU$bn)	% of Total Funds Under Management
AMP Capital Investors Limited	$6.3	23.4%
Macquarie Bank Limited	$3.2	11.9%
BT Funds Management Limited	$3.0	11.2%
Colonial First State Investment Ltd	$2.8	10.4%
Vanguard Investments Australia Ltd	$2.5	9.3%
Lend Lease Corporation Limited	$2.5	9.3%
MLC Investments Limited	$1.8	6.7%
APN Funds Management Limited	$1.8	6.7%
Legg Mason Asset Management Limited	$1.7	6.3%
UBS Global Asset Management (Australia) Ltd	$1.3	4.8%
Total	$26.9	69.2%

Source: PIR (2007a)

A number of global PSFs, such as AMP, APN, Colonial First State, BT, RREEF, have been introduced reflecting the increased maturity in many global markets and the significant recent developments of REITs in Asia and Europe.

PIR (2007a) show wholesale PSF total returns of 18.02% - 29.31% (over 1 year) and 15.71% - 19.1% (over 5 years), with retail PSF having total returns of 19.24% - 40.42% (over 1 year) and 13.93% - 23.63% (over 5 years). These high returns illustrate the strong appeal of PSFs as an investment asset class and funding tool.

2.3.3 Direct Property Syndicates

Direct Property Syndicates (DPS) are pooled property funds that can be invested in (via a fund manager) for approximately $10,000 to gain commercial property exposure. Typically, the grade of property in these syndicates is of lesser quality and value to that included in LPT portfolios. However, there is generally no market to trade the units in the property syndicate; hence there is no liquidity and the units are kept until the property is sold. Typically this is 5 - 10 years, during which time quarterly distributions are received. Some newer property syndicates are offering some limited liquidity as an exit strategy.

As at December 2006, funds under management by DPS's were AU$12 billion, with 291 property syndicates comprising 99,107 investors and 586 properties (PIR 2007b). Table 2.12 shows some of the top DPS managers, who account for 68% of the total market share.

Table 2.12: Leading DPS Managers: December 2006

Fund Manager	No. of Properties	Total Assets (AU$m)	% of Total Funds Under Management
Centro Properties Group	100	$3,570	29.8%
DB RREEF	28	$2,190	18.3%
Cromwell	25	$970	8.1%
Becton Investment Management Ltd	46	$630	5.3%
Australian Unity Property Limited	35	$408	3.4%
SAITeysMcMahon	18	$355	3.0%
Total	252	$8,123	67.7%

Source: PIR (2007)

Jones Lang LaSalle (2003), Upton (1998) and Glanville (1987) show the advantages and disadvantages of investing in property syndicates. The advantages include high initial yields, substantial tax benefits, higher gearing levels and access to varied forms of property investment. The risks associated with syndicates include limited diversification in individual syndicates, higher asset risk profile, relative illiquidity and a higher fee burden.

2.3.4 Unlisted Retail Property Funds

These are prospectus (Product Disclosure Statement) based funds open to retail and private investors (an unlisted property trust). Investment strategy centres on the ownership of property. These trusts are 'open-ended' and can raise additional capital to fund subsequent property acquisitions when required (PIR 2007b).

There were 92 funds with 48,182 investors and AU$7.1 billion in funds under management as at December 2006. The number of properties held is the second largest of all managed funds at 1,009 (PIR 2007a). The market is dominated by Multiplex Capital (AU$1,419 million) and SAITeysMcMahon Property Limited (AU$946.1 million), who together have a market shares of 33%. Table 2.13 shows the top ten unlisted retail fund managers, who account for 72% of market share.

Table 2.13: Leading Unlisted Retail Fund Managers: December 2006

Fund Manager	Total Assets (AU$m)	% of Total Funds Under Management
Multiplex Capital	$1,419	20.0%
SAITeysMcMahon Investments Limited	$946	13.3%
Westpac Funds Management Limited	$509	7.2%
APN Funds Management Limited	$382	5.4%
Abacus Funds Limited	$367	5.2%
Property Funds Australia Limited	$334	4.7%
Trinity Funds Management Limited	$317	4.5%
Lachlan REIT Limited	$273	3.8%
Australian Unity	$268	3.8%
James Fielding Funds Management Limited	$259	3.6%
Total	$5,074	71.5%

Source: PIR (2007a)

Unlisted retail funds have played a pivotal role in the establishment of property funds in non-traditional or emerging property sectors of self-storage (APN, Abacus), retirement (Australian Property Custodian), childcare (SAITeysMcMahon), leisure (James Fielding), healthcare (Australian Unity, SAITeysMcMahon) and agriculture (Colonial First State Global Asset Management) (Newell & Peng 2006).

2.3.5 Unlisted Wholesale Property Funds

Unlisted wholesale property funds account for AU$39 billion in total assets, comprising 557 institutional-grade commercial properties in their portfolio (PIR 2006). Table 2.14 gives the leading unlisted wholesale property funds, highlighting the significance of AMP Capital (AU$8.7 billion) and QIC (AU$6.0 billion), with these top ten unlisted wholesale property fund managers accounting for an 86.9% market share of the unlisted wholesale property fund sector.

Table 2.14: Leading Unlisted Wholesale Fund Managers: December 2005

Fund Manager	Total Assets (AU$m)	% of Total Funds Under Management
AMP Capital Investors Limited	$8,680	22.3%
QIC Real Estate Funds Pty Ltd	$6,045	15.5%
Colonial First State Property	$5,191	13.3%
ISPT Pty Limited	$3,985	10.2%
Lend Lease Corporation Limited	$3,479	8.9%
DB RREEF Funds Management Limited	$1,624	4.2%
Eureka Funds Management Limited	$1,519	3.9%
Macquarie Bank Limited	$1,468	3.8%
ING Management Limited	$1,100	2.8%
Valad Commercial Management Limited	$805	2.1%
Total	$33,896	86.9%

Source: PIR (2006)

Superannuation funds are major contributors to the unlisted wholesale property funds, seeking significant long-term exposure to quality commercial property portfolios and focusing on total returns. The major unlisted wholesale property funds are shown in Table 2.15, with several major players having diversified and sector specific wholesale funds. Limited liquidity is available with these unlisted wholesale funds.

Table 2.15: Leading Unlisted Wholesale Funds: December 2005

Fund Manager	Total Assets (AU$m)	% of Total Funds Under Management
AMP Australian Core Property Portfolio	$4,106	10.5%
QIC Property Fund	$4,104	10.5%
ISPT Core Fund	$3,286	8.4%
APPT-Retail	$2,292	5.9%
GPT Wholesale Shopping Centre	$2,100	5.4%
AMP Wholesale Shopping Centre	$1,992	5.1%
QIC Shopping Centre	$1,941	5.0%
Deutsche Wholesale Office	$1,624	4.2%
AMP Wholesale Office	$1,600	4.1%
Macquarie Goodman Wholesale Fund (Aust)	$1,239	3.2%
	$24,284	62.3%

Source: Newell (2007c)

Significant growth is expected in these unlisted wholesale funds, as superannuation funds seek to increase their exposure to property with the increase level of capital flows in superannuation funds in Australia. Recently, this has seen a number of institutional investor expand their offerings on unlisted wholesale property funds (GPT, Westfield, Stockland and DB), as well as international property also being included in unlisted wholesale property funds (ISPT) (Newell 2007c).

Whilst LPTs delivered the highest annual average returns over Q3:1995 - Q4:2006 (13.67%), wholesale property funds gave strong returns (10.62%) at a low level of risk (1.59%), seeing wholesale property funds being the second best performed on a risk-adjusted return basis (via Sharpe index); only exceeded by direct property and out-performing both LPTs and shares (Newell 2007c).

2.3.6 Unlisted Hybrid Property Funds

A hybrid fund is defined as a fund which targets a portfolio composition comprising a majority allocation (up to 85%) to direct property assets, with the balance incorporating an allocation to indirect property through ownership of unlisted and listed property securities. Essentially, hybrids are positioned between direct property funds and property securities funds. Clearly hybrids have the potential to offer a broad range of diversification options, subject to double layering of fees. Some of the characteristics of several hybrid property trusts operating in the market are shown in Table 2.16.

Table 2.16: Characteristics of Hybrid Property Trusts

Fund	Gross Assets (AU$m)	Gearing (%Total Assets)	Target Direct Property Allocation	Direct Property Allocation	Direct Property Sector
The Diversified P.F.	$838	37%	20-95%	74%	Diversified
Macquarie P.F.	$453	40%	50-90%	81%	Office
Westlawn Property Trust	$300	50%	n/a	87%	Diversified
Investa Diversified Office Fund	$214	44%	n/a	66%	Office
Reed Property Trust	$100	58%	70%%	96%	Retail
Charter Hall Diversified P.F.	$90	69%	80%	98%	Diversified
APN Direct P.F.	$43	0%	20-75%	29%	Diversified
WRF Property Fund	$38	53%	~80%	89%	Diversified

Source: PIR (2007b)

2.3.7 Direct Financing

2.3.7.1 Mezzanine Funds

Mezzanine property lenders supply the layer of funding that bridges the gap between the first mortgage (senior debt) and a developer's or investor's own equity (Chu & Lonegan 2006; Psaltis & Evans 2002). There has been a rapid growth in recent years in funding of property and construction projects both world-wide and in Australia. In Australia, non-residential construction finance commitments totalled AU$18.2 billion in the twelve months to September 2005, up from AU$8 billion recorded five years earlier. Mezzanine debt lending was estimated at around AU$15 billion to AU$22 billion for the year 2005, which was equivalent to 5% of the total construction lending market in Australia. This compares with 10% to 15% estimated in the USA (Mirvac 2006).

The use of mezzanine finance to fund property development projects in Australia is fraught with much controversy surrounding it after the collapse of several high profile projects such as Wespoint, Fincorp and Australian Capital Reserve. This has led the Australian Securities & Investments Commission (ASIC) issuing consultation papers to increase disclosure in unlisted and unrated debentures aimed at protecting retail investors (Australian Securities & Investments Commission 2007).

Chu and Lonegan (2006) show how the two commonly used methods of measuring the capital structure occupied by mezzanine finance used in development, loan-to-cost ratio (LCR) and loan-to-value ratio (LVR) using the value to the completed project do not capture all the inherent risks involved in property development. LCR ignores market risk and thus overstates LVR. Market conditions could deteriorate at the time the property is completed and land is acquired at a significant discount to what would otherwise be considered to be market value. LVR arrived at using the value of a completed project can severely understate the slice of the capital structure occupied by mezzanine finance because it does not explicitly allow for risk that the owner's forecast of sale price or independently estimated value of the development may not be achieved upon completion.

2.3.7.2 Bank Lending

As at December 2006, total commercial property exposure by all banks was AU$117.4 billion, with 0.4% and 0.2% classified as nonperforming and impaired[5], respectively (APRA 2007a; Reserve Bank of Australia 2006). Banks have generally been reluctant to securitise their commercial property loans due to the low default rates as shown in Table 2.17. Levels of bank lending to the commercial property market have an impact on the development of indirect public debt and equity funding/investment instruments.

[5] Assets on which payments are in arrears by more than 90 days or otherwise doubtful and the amount due is not well covered by the value of collateral. The remainder of these assets were in arrears, but were well covered by collateral.

Table 2.17: Australian Commercial Bank Property Exposure – September 2007

Sector	Commercial Property Exposure- All Banks (%)	Share of Total Commercial Lending (%)♣	Impaired Assets Share of Commercial Property Exposure (%)
Office	26.1	7	0.1
Retail	18.3	4	0.1
Industrial	11.2	3	0
Land Developments/subdivisions	11.8	N/K	N/K
Residential	15.6	7	0.4
Tourism and leisure	4.4	2	0.1
Other	12.6	3	0.2
Total	100	27	0.2

♣As at March 2007. N/K: Not known.

Source: Reserve Bank of Australia (2007); APRA (2007a)

Banking lending for commercial property investment has been buoyant recently, increasing by 27% over the year to March 2007, with lending to the industrial property market growing by 31% (Reserve Bank of Australia 2007). This is attributable to the strong property performance supported by improving business climate. Prime office property prices rose by 22% over the year to December 2006, the strongest annual growth since December 1988, while industrial property prices rose by 12% over the same period. The NAB Business November 2007 Survey (National Australia Bank 2007) states that business conditions remain at record levels despite financial market turbulence and that though confidence has edged down, it is still at robust levels.

With strong commercial property market performance and business climate expected to continue in the medium to short term, bank lending to the commercial property market is expected to be favourable. Banks though are implementing prudent lending practices in conformity with the Basel II Accord (APRA 2007b; The Economist 2005) which requires maintenance of adequate capital reserves and undertaking more credit assessment of pledged assets.

2.3.8 Mortgage Funds

A mortgage fund is a straight forward trust which holds a portfolio of mortgages over property assets. The security is normally by way of a mortgage giving the unit holder first priority over the assets in the event of default. The objective of mortgage trust is generally to provide stabilised and relatively low-risk income to the investor which is derived from the loan interest payments from the borrower (PIR 2005). There are two main types of mortgage funds:

i) *Pooled Mortgage Scheme*: A fund that pools together investors' monies to invest in a diversified range of approved mortgages over property. Generally first mortgages.

ii) *Select Mortgage Scheme:* A fund in which the investor invests in a specific mortgage chosen by the investor. Borrowers and lenders are matched.

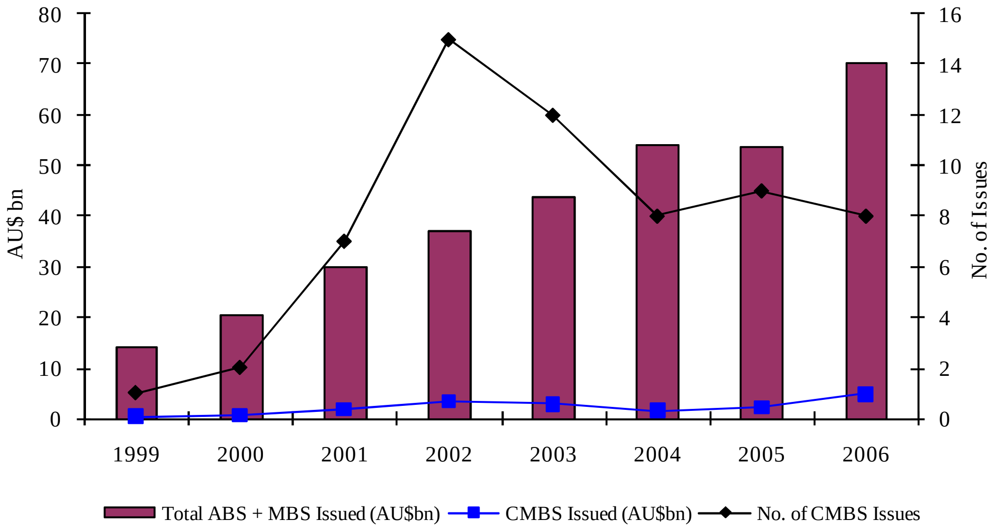
As at December 2006, there were 104 mortgage funds with 162,310 investors and AU$24.7 billion in total assets (PIR 2006).

2.3.9 CMBSs and LPT Bonds

2.3.9.1 CMBS

The Australian CMBS market for has been one of the most dynamic and fastest-growing capital market sectors (Richardson 2003). The market has undergone significant development since the first transactions came to the market in 1999, with a range of transaction types and issuers now accessing the market. The first CMBSs in Australia were done by Leda Holdings in 1999, followed by the Longreach/Qantas head office securitisation and the David Jones stores securitisation in 2000. To date, a total of over 60 CMBSs with nearly a 180 tranches totalling over AU$17.4 billion have been issued.

Figure 2.3: Australian Annual ABS/MBS/CMBS Issuance Volumes



Source: Standard and Poor's (2006a)

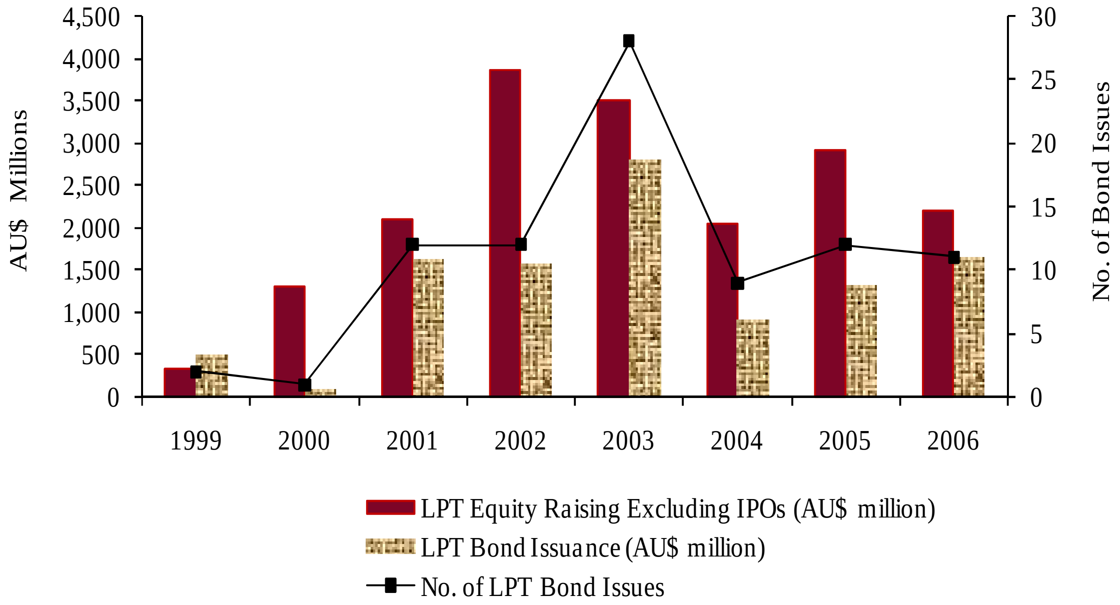
The overall cumulative Australian CMBS issuance since 1999 reached AU$17.5 billion at the end of 2006. In 2006, a record number of new issues exceeding AU$4.9 billion were issued, passing the earlier issuance record year of 2002 (AU$3.7 billion)(Standard & Poor's 2007c). The years 2003 and 2005 produced issues of over AU$2 billion per year. In 2004, there was a slight fall in issuances to AU$1.6 billion. Figure 2.3 shows the volumes of CMBS issuance since 1999 in dollar amount and number of issues per annum. It also shows the size of the CMBS issues in relation to the overall asset backed securities market. The total ABS issuance in the year 2006 was AU$70 billion, of which the CMBS sub-market accounted for 7%. This represents a significant leap from 2% of the AU$14.4 billion ABS total issuance in 1999 (Fitch Ratings 2007b).

Further details on Australian CMBS market are presented in the chapter 3.

2.3.9.2 LPT Bonds

Bonds provide an important mechanism by which firms obtain new funds to finance new and continuing activities and projects. Bond issuance has been recognised by Listed Property Trusts (LPTs) as an important debt funding tool. The total cumulative LPT bond issuance volume from 1999 to December 2006 reached AU$10.5 billion, with a total of 87 issues as shown in Figure 2.4. Generally, annual LPT bond issuance has remained stable at around AU$1.5 billion, with the exception of 2003 when issuance nearly reached AU$2.8 billion. LPT bond issuance as a funding source can be compared to LPT equity raisings, excluding initial price offerings (IPOs). Although LPTs have raised more funds through issuing additional securities (AU$18.2 billion), bond issuance has featured prominently as well at an average of 65% of equity raisings. For instance in 2006, LPTs issued bonds worth AU$1.7 billion and raised AU$2.2 billion through issuance of additional securities.

Figure 2.4: Australian LPT Bond Issuance and Equity Raisings Excluding. IPOs: 1999 - 2006



Source: Author's compilation from various Property Australia magazines and Connect 4 Company Prospectuses database (1999-2006)

To further emphasise the importance of issuance of bonds by LPTs as a funding source, LPT bond issuance is compared to the issuance of CMBSs which is dominated by LPTs (Chikolwa 2007a; Standard & Poor's 2005b)[6] from 2000 to 2006; see Table 2.18. Although more funds have been raised via CMBS (AU$14.3 billion) than LPT bonds (AU$10 billion), more LPT bonds (total number issued 85) have been issued in number than CMBSs (total number issued 66). Furthermore, in some certain years (2001 and 2003) more funds where raised via LPT bonds than CMBS issuance.

[6] Listed Property Trusts have a 65% CMBS market share.

Table 2.18: Australian LPT Bond Issuance and CMBS Issuance: 1999 – 2006

Year	CMBS Issuance		LPT Bond Issuance	
	AU$m	No. of Issues	AU$m	No. of Issues
2000	$357	2	$100	1
2001	$1,320	5	$1,615	12
2002	$2,845	19	$1,570	12
2003	$2,191	14	$2,792	28
2004	$1,513	7	$905	9
2005	$2,102	8	$1,320	12
2006	$4,013	11	$1,650	11
Total	$14,340	66	$9,952	85

Source: CMBS issuance: Chikolwa (2007a); LPT bonds: Author's compilation from various Property Australia magazines (1999 - 2006)

The Australian LPT bond market has remained competitive in comparison to their US equivalent, REITS unsecured debt offerings, with the two countries showing its increase in importance as a debt funding source. Table 2.19 shows LPT bond issuance and US REIT unsecured debt offerings by value and number from 1999-2006.

Table 2.19: Australian LPT Bond Issuance and US REITS Unsecured Debt Offerings: 1999 - 2006

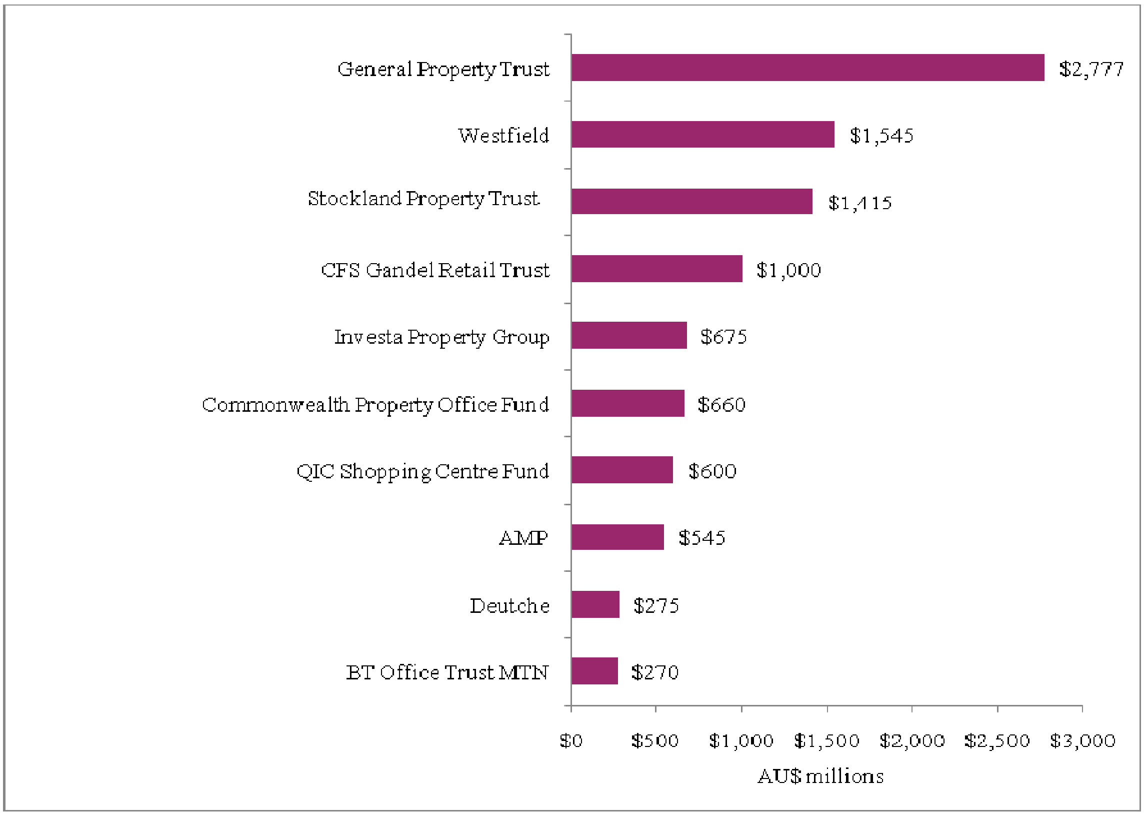
Year	LPT Bonds		US REIT Unsecured Debt Offerings	
	AU$m	No. of Issues	AU$m	No. of Issues
1999	$500	2	$10,337	69
2000	$100	1	$9,117	70
2001	$1,615	12	$12,864	44
2002	$1,570	12	$13,830	71
2003	$2,792	28	$14,163	68
2004	$905	9	$22,499	97
2005	$1,320	12	$21,230	105
2006	$1,650	11	$32,841	82
Total	$10,452	87	$136,880	606

US$1 = AU$0.7692 as at 31 December 2006

Source: LPT bonds: Author's compilation from various Property Australia magazines (1999 - 2006); US REITS: NAREIT website 2007

Figure 2.5 shows the top 10 LPT bond issuers who command a 93% market share and have issued bonds worth a combined total of AU$9.8 billion from 1999 - 2006. Major players in the LPT bond market include GPT (AU$2.8 billion), Westfield (A$1.5 billion), Stockland (AU$1.4 billion) and CFS Gandel Retail Trust (A$1 billion).

Figure 2.5: Top 10 Australian LPT Bond Issuers: 1999 - 2006



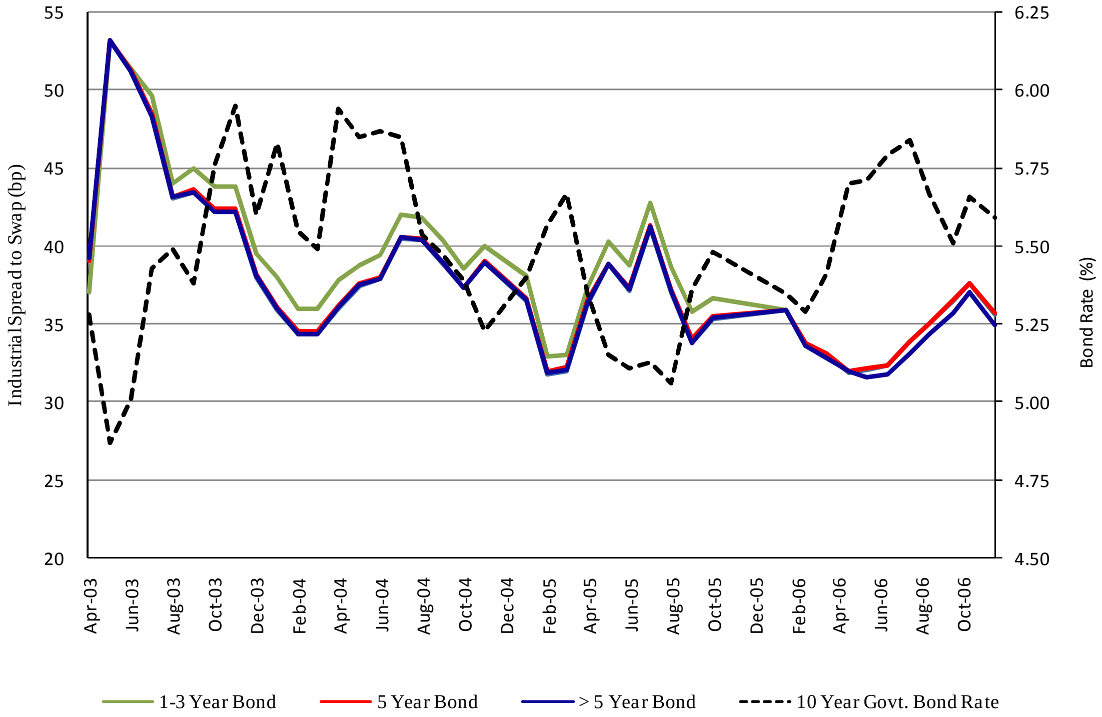
Source: Author's compilation from various Property Australia magazines (1999 - 2006)

An interesting feature is that of the top 5 LPT bond issuers, only the Investa Property Group have issued CMBSs with the remaining preferring only LPT bond issuance. Further, of the top 5 LPT bond issuers, Westfield, General Property Trust and Stockland are in the UBS Leaders 300 Index, emphasizing their ability to use their balance sheet to back bond issuance.

Figure 2.6 shows an inverse relationship between industry spread to swaps and 10-year government bond rates; as 10-year government bonds rates rise, industry spread to swaps tighten and vice versa. Generally, 1 - 3 year LPT bonds have been priced at 2 -

3bp above 5 year LPT bonds. There are no marked differences in swaps between 5 year and above LPT bonds.

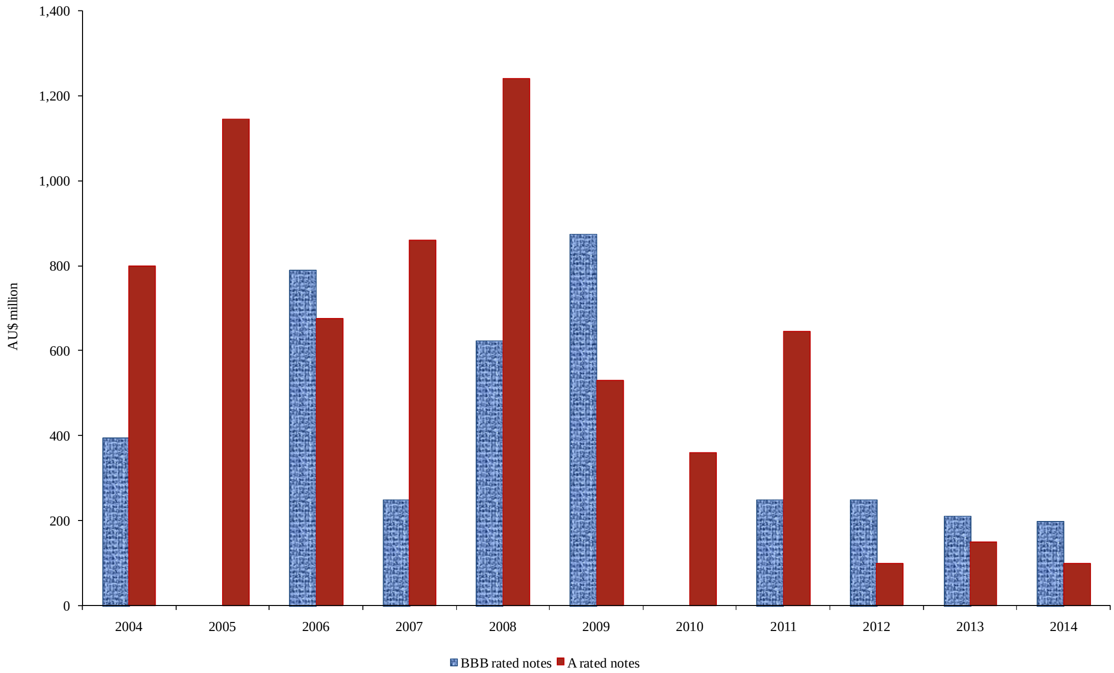
Figure 2.6: Australian LPT Bond Industry Spread to Swap and 10-Year Government Bond Rates: April 2003 - October 2006



Source: Author's compilation from various Property Australia magazines (1999 - 2006) and RBA (2007)

The sub-prime mortgage market events in the US are having an impact on the global bond markets and may have an impact on the refinancing prospects for maturing LPT bonds. Figure 2.7 presents the maturity profile of all the LPT bonds issued between 1999 and 2006. Nearly AU$3.3 billion worth of LPT bonds are maturing in 2007 - 2008, of which 45.9% are BBB rated bonds. As investors require greater compensation to invest in BBB rated bonds, refinancing will become more expensive.

Figure 2.7: Australian LPT Bond Maturity Profile



Source: Author's compilation from various Property Australia magazines (1999 - 2006)

The macroeconomic outlook for the Australian market remains benign, with historically low unemployment rates and a low interest environment expected to continue. However, liquidity and valuation issues surrounding securitised debt backed by sub-prime mortgages in the US home market has resulted in the 'credit crunch' in the global financial system due to an increased perception of risk on the part of lenders. This has resulted in higher spreads on securitisable financial receivables and unsecured debt offerings.

2.4 SUMMARY

The future outlook of various property sectors is positive with large capital inflows being directed towards the asset class. At the backdrop of the strong commercial property market performance is the growth of various funding sources and investment options showing the maturity of the market. Funding and investment options ranging from unlisted property trusts, LPTs, mortgage funds, property securities funds, direct lending, CMBS and LPT bonds, cater both retail and wholesale investors.

The maturing nature of the LPT market has seen the increased sophistication of LPT debt management. Intense competition and pressure to add value to LPT returns have required LPT managers to be more sophisticated in capital and debt management (Blundell 2001). A range of sophisticated debt products including CMBS, property trust bonds, hybrids and off-balance sheet financing are being utilised. In particular, usage among major commercial property owners, such as LPTs, of CMBS as funding source continues to grow. As such, the next chapter reviews the principles behind CMBSs and CMBS market activity in US, Europe, Asia and Australia.

CHAPTER 3

AN OVERVIEW OF COMMERCIAL MORTGAGE-BACKED SECURITIES

3.1 BACKGROUND

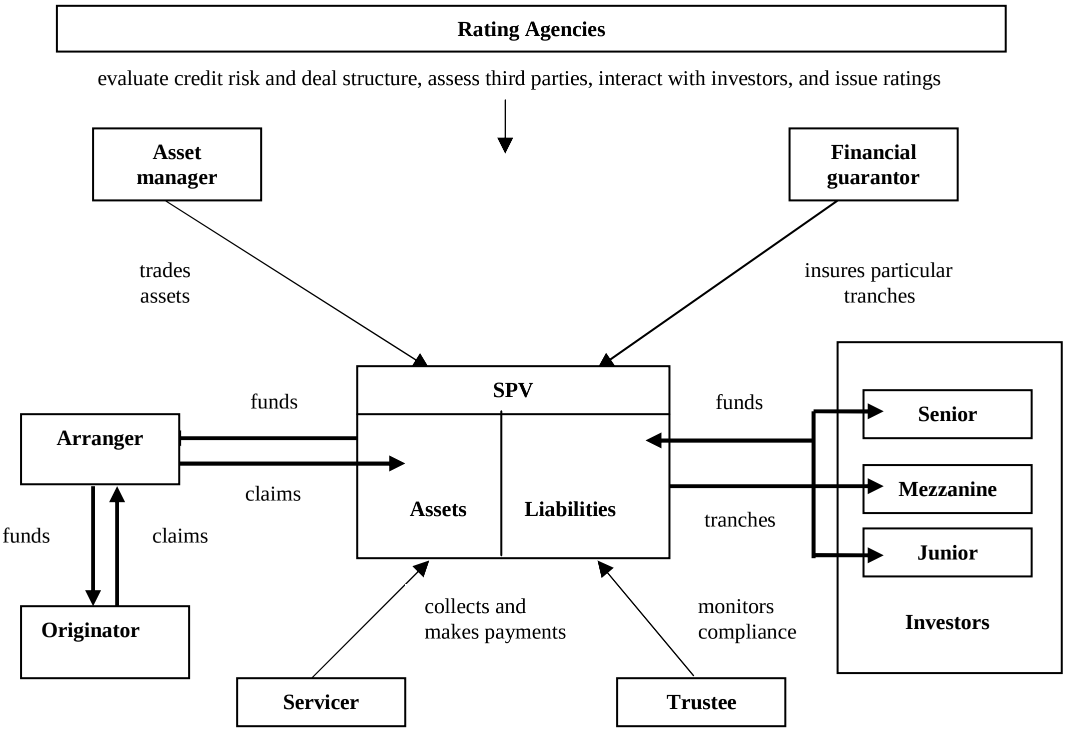
Since Australian CMBSs are predominantly a form of securitisation of direct property assets (Jones Lang LaSalle 2001), overviews of the Australian commercial property market and the various commercial property funding vehicles are important as covered in the previous chapter. CMBSs are one of the many commercial property funding tools and investment options.

As such the purpose of this chapter is to present the principles behind CMBS and its significance as a funding source internationally and in Australia. CMBS market activity in the US and EU is reviewed as 97% of all global CMBS issuances in 2006 occurred in the two regions (Commercial Mortgage Alert 2007). In addition, market activity in Asia is reviewed to show the stature of the Australian CMBS market in the Asia-Pacific region. Other regions are not reviewed due to lack of data.

3.2 PRINCIPLES BEHIND COMMERCIAL MORTGAGE-BACKED SECURITIES

Asset-backed securitisation (ABS) or asset securitization, of which CMBS is a sub-class, is a creative financing arrangement whereby debt instruments backed by assets such as mortgages, cash flows generated from the assets, are issued and offered for investment purposes in the capital markets (Ong et al. 2000). Alles (2001) defines asset securitisation as a process where ill-liquid assets owned by a financial institution, are pooled and sold in the legal or economic sense, to a third party referred to a special-purpose vehicle (SPV). The legal transfer or separation of the asset to an SPV that issues bonds is the key feature that distinguishes an asset securitization arrangement from the traditional mortgage-backed or collateralised bond issues. A generic depiction of the process involved in structuring an asset-backed security is graphically shown in Figure 3.1.

Figure 3.1: Structured Finance: Key Market Participants



Source: Bank of International Settlements (2005)

In Australia, the description of Commercial Mortgage-Backed Securities (CMBS) has been expanded and accepted in the market to include a form of securitisation of direct property assets (Jones Lang LaSalle 2001), in addition to the traditional definition of the securitisation of commercial mortgages (Jacob & Fabozzi 2003). Securitisation has further been extended to non-traditional asset classes such as retirement villages, leisure parks, nursing homes, self-storage and infrastructural assets such as toll roads, utilities, airports, power stations, wind farms, healthcare facilities, education facilities, and correctional facilities. Chikolwa (2007c) shows how ABS can be used as a funding source by developing countries for infrastructural projects.

Credit enhancement is undertaken to act as a “ring-fence” around the assets to avoid insolvency and also results in a higher rating of the bonds issued. The new obligations are of different form than the assets- different maturity, currency, security, or interest rate-and because of this difference are more attractive to investors. The differences are often related to credit ratings. The theory of why ABS works is that the sum of parts is greater than the whole (Partnoy 1999). As a result, transaction risks amongst many investors in several classes of securities known as tranches can be spread (Geltner & Miller 2001). The credit quality of the security is directly related to the yield of the issue. The higher the credit quality the lower will be the yield and the more successful will be the issue (Alles 2001).

Some of the credit enhancement techniques that are used are: credit tranching; overcollateralisation; cash collateralisation; reserve funds; spread accounts; amortisation triggers; related party guarantees; letters of credit; monoline insurance; and multiline insurance.

According to Henderson & ING Barings (1997), factors that support securitization are:

i. Funds can be provided at attractive rates as a result of the added credit enhancement and resulting higher credit rating.
ii. An improved company's return on capital. Structured correctly, a securitization will remove securitised assets from the originator's balance sheet, thus generating cash flow without increasing debt.
iii. Provision of an alternative source of funding.
iv. Provision of matched funding for medium and long-term receivables.

The limits of the securitisation transaction can be found on the cost side and on the legal and structuring side. For example in Singapore, outright sale brokerage costs are between 0.5% and 1.0% of the selling price, whereas the total cost of asset securitisation is in the region of 1.5% to 2%, excluding the extra management effort and time involved in structuring such deals (Ooi et al. 2003). The cost of securitisation includes front-end fees and expenses, the running cost of debt funding, the running cost of ancillary facilities and the cost of first loss cover or credit enhancement.

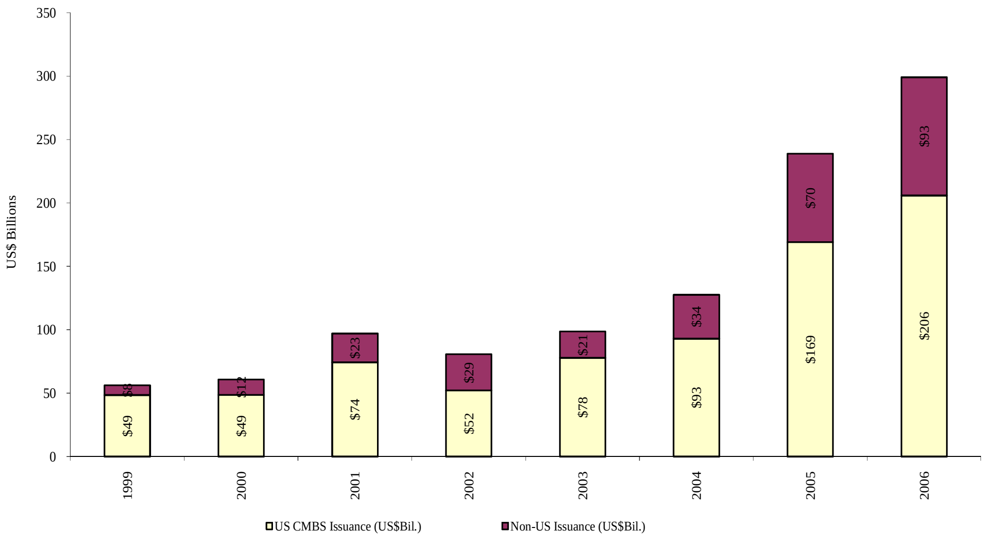
3.3 EVOLUTION OF COMMERCIAL MORTGAGE-BACKED SECURITIES

The US has been the market leader in the development of real estate securitised products, both residential and commercial, with other countries adapting the US model to suit local conditions. The market for CMBS is growing rapidly. Hoesli and MacGregor (2000) quote Corgel et al. (1998) as saying:

> *'the market for CMBS is one of the most dynamic and fastest-growing sectors in the capital markets. Although the value of outstanding commercial mortgages being used as collateral for CMBSs is only approximately 8% of total outstanding commercial debt, the size of the market is significant given CMBS were virtually non-existent prior to 1990.'*

This is clearly depicted by Figure 3.2. The global CMBS market issuance which stood at AU$5.1 billion (US$4 billion) in 1990 had grown to AU$380 billion (US$299 billion) by the end of 2006.

Figure 3.2: CMBS Global Issuance (1999 - 2006)



Source: Commercial Mortgage Alert (2007)

The evolution and early development of CMBS illustrated below draws largely on literature review by Vogel (2003); Sing et al. (2004b); and Underwood (2005), unless otherwise quoted.

Sing et al. (2004b) broadly categorises the development of the CMBS market in the US into three phases:

- packaging of commercial mortgages on single properties into CMBSs in the mid-1980s;
- setting up of the Resolution Trust Corporation (RTC) under the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) to liquidate non-performing loans of distressed thrifts and banks that were severely hit by the crash in the commercial property market in the late 1980s;
- and shifting of CMBS loan pools to small and low-quality commercial properties that were riskier.

In the first phase, CMBS issued were mainly in a single tranche. Despite the legislative passage that facilitated the creation of a non-taxable Real Estate Mortgage Investment Conduit (REMIC) in 1986, the use of the multi-tranche securities structure was infrequent in the 1980s.

The second phase saw the RTC selling non-performing loan assets to investors in Wall Street by introducing proper credit rating for loans that were pooled into CMBS portfolio by putting in a subordinated structure in CMBS securities. RTC was able to provide adequate risk protection to investors of the senior CMBS tranche without obtaining credit enhancement by government sponsored agencies like the Federal Housing Administration (FHA) or the Veteran Administration (VA). Having accomplished its objective, the RTC was disbanded in 1995. However, the RTC model continues to be adopted by other commercial real estate lenders to tap into capital sources in the CMBS markets. The strong demand coupled with attractive yield spreads for the CMBS issued by the RTC further boosted investors' confidence in the instruments.

The final phase saw the gap in financing small and low-quality commercial properties filled quickly by conduit mortgage lenders after the mid 1990s. Diversified portfolios of "jumbo-grade" commercial mortgages with asset values in a range of US$1 million to US$10 million provided a stable supply of the conduit-CMBS, which was estimated to be US$25 billion to US$30 billion a year on average.

Liquidity creation, specialisation in loan production and customization of securities were three important factors that underpinned the continuous growth of the conduit CMBS market (Sing et al. 2004b). Karbelk et al. (2006) are of a similar view when they state that standardisation, managerial leadership, and broadened risk management underpinned this growth.

Vogel (2003) identifies four factors as having partly contributed to the rise of CMBSs: great timing; great economy; regulation; and technology and economies of scale. After the crash in commercial property market in the late 1980s, the time was perfect to launch CMBS. Distressed thrifts and banks severely hit by the crash were anxious to liquidate non-performing loans from their portfolios and investors and developers were so willing to put up with a product as difficult, expensive and inflexible as the CMBS.

The mid and late 1990s turned out to be wonderful times for real estate lenders as the economy was strong. The delinquency rate (and the percentage of loans in foreclosure) declined almost every quarter for the rest of the decade so that in 1999 and 2000 the delinquency rate was under one percent. The painful lessons from the early 1990s allowed lenders to impose greater discipline on developers, which kept supply and demand at reasonable balance in most real estate markets.

With the banks and insurance companies suffering billions of dollars in losses, the federal government and the bank and insurance regulators created rules and incentives to get them to reduce their real estate portfolios. The new reserve requirements were a disincentive for banks and insurance companies to hold real estate loans in their portfolios and an incentive for them to purchase and hold CMBSs.

The advent of low cost personal computers, allowed investors to analyse these complicated transactions with ease. Efficiency and economies of scale were also introduced with the specialisation of functions of the various parties involved

According to Wachovia Securities analyst Tony Butler, the market “took off in earnest in 1996 - 1997” (Vogel 2003). This was the time when defeasance was added as a feature to deals to protect bond holders. Defeasance is a form of pre-payment protection in which borrowers who want to pre-pay a CMBS loan and remove it from a CMBS deal must replace the principal and interest cash flows in a deal using US treasury securities (Davison et al. 2003).

Issuance in the CMBS market grew by an average 37% through much of the 1990s, reaching AU$102 billion (US$80 billion) in 1998. However, in August of that year, the market was effectively shut down when the Russian debt crisis caused panic in the general bond market. The market eventually rebounded, helped by the development of collateralised debt obligations (CDOs), which provided a more efficient outlet for CMBS bonds that were below investment grade (Vogel 2003).

However, complexities in the valuation and pricing of CMBS CDOs as a result of the sub-prime mortgage crisis have resulted in a drastic slowdown in CMBS issuance in the US and a shutdown of the CMBS market in Australia from Q3:2007.

3.4 COMMERCIAL MORTGAGE-BACKED SECURITIES IN OVERSEAS MARKETS

On a global level, the CMBS market increase is linked to the United States of America (US) market. For the period 1999 to 2006, CMBSs totalling over AU $977 billion (US$770 billion)[7] had been issued in the US compared to AU$367 billion (US$289 billion) for the rest of the world (Figure 3.2). Industry data show that in 2006 issuance of commercial CMBS in the US was around AU$261 (US$206 billion), a 22% increase over the previous year, and non-US issues were AU$118 (US$93 billion), representing an increase of 34% over the 2005 period (Commercial Mortgage Alert 2007). There was strong activity in Europe (EU) in 2006, where around AU$108 billion (€64.75 billion) of

[7] For ease of comparison, the interbank exchange rates of US$1=AU$1.27 and EUR€1=AU$1.67 as at December 31, 2006 have been used.

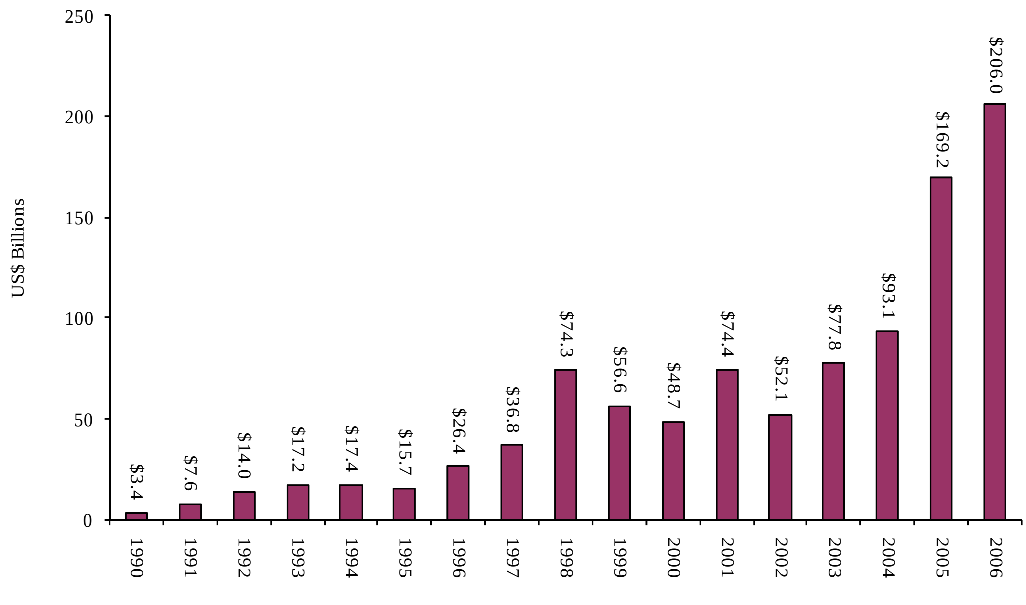
CMBS were issued in 2005, with around three quarters of this amount issued in the United Kingdom (UK). In 2006, AU$4.9 billion of newly rated notes were issued in Australia, an increase of 38% on the previous year (Standard & Poor's 2007c).

The 2006 CMBS issuance of AU$261 billion (US$206 billion) in the US, AU$108 billion (€64.75 billion) in the EU and AU$4.9 billion in Australia, represents 40%, 12% and 7% respectively of the overall securitisation markets in these regions (Standard & Poor's 2007b; 2007c). Although these percentages appear to be low except for the US, CMBSs are seen as a good source of funding by issuers and as a good investment option by investors.

3.4.1 US CMBS Market

The US has been leading the way in global issuance of CMBSs. For the period 1990 to 2006, CMBSs totalling over AU$1,257 billion (US$990.7 billion) had been issued in the US. Figure 3.3 shows the total amount of CMBS issuance per year since 1990.

Figure 3.3: US CMBS Issuance (1990 - 2006)

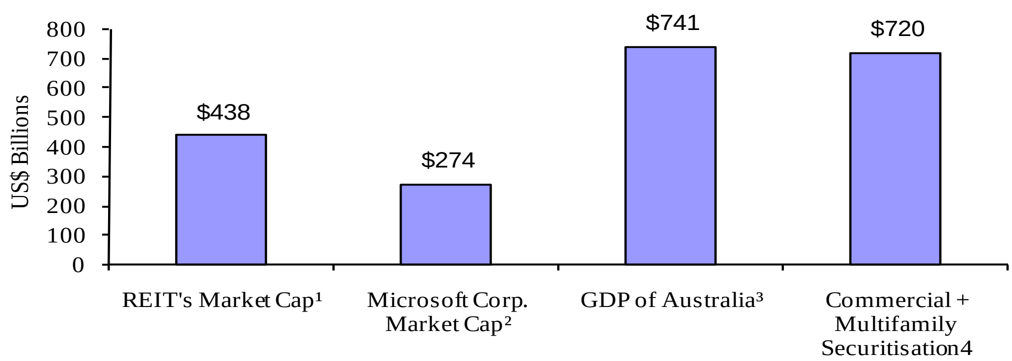


Source: Commercial Mortgage Alert (2006)

US CMBS issuance rose from AU$4.3 billion (US$3.4 billion) in 1990 to AU$261 billion (US$206 billion) in 2006. As of the second quarter of 2005, there was AU$596 billion (US$470 billion) worth of CMBS outstanding in the US market, representing around 40% of the overall asset-backed securities market and around 20% of the overall commercial loan market.

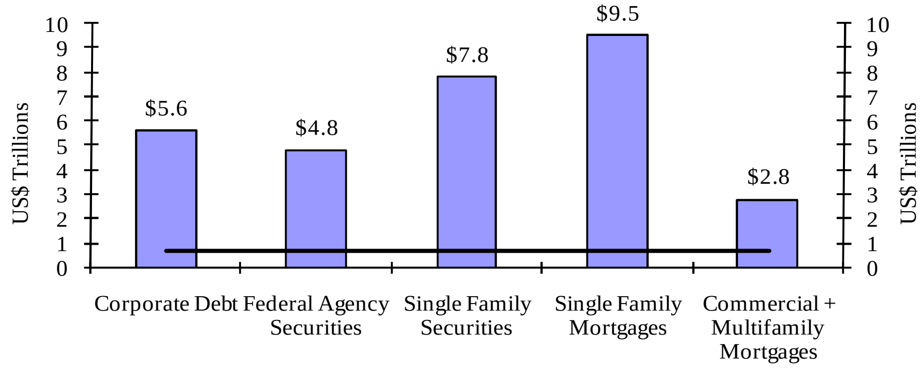
Figure 3.4 shows market size of commercial and multifamily securitisations (US$720 billion) with that of REITs (US$438 billion market cap), Microsoft (US$274 billion market capitalisation on the New York Stock Exchange) and the GDP of Australia (US$741 billion). The US$720 billion worth of commercial and multifamily securitisations outstanding only represents about 26% of commercial and multifamily mortgages that have been issued (Figure 3.5). This further shows the potential for growth of this investment class, with 74% of commercial and multifamily mortgages yet to be securitised.

Figure 3.4: Market Comparison (as of December 31, 2006)



Source: (1) NAREIT; (2) Microsoft Website(3) The Economist, January 3, 2007 (4)Federal Reserve, Flow of Funds

Figure 3.5: Market Comparison (as of September 30, 2006)



Source: Federal Reserve, Flow of Funds (2006)

According to Commercial Mortgage Alert (2007), US CMBS backed by retail property mortgages have commanded roughly a 25% share of issues by value for several years. CMBSs of mortgages on multi-family properties have declined in share as CMBSs on mortgages on office properties have increased in importance. CMBSs backed by mortgages on industrial and hotel property types have retained relatively small, but significant shares.

From since 1993 until Q3:2007 when market turned, the proportion of issues carrying triple-A ratings increased steadily, largely as a result of a number of improvements throughout the CMBS market. Originators and issuers improved underwriting, documentation, and marketing, which helped to improve the average loan quality. Rating agencies improved the rating process with more sophisticated models incorporating more historical performance data, thereby providing a better guidance on risk. Property market fundamentals remained healthy; and the market for CMBS deepened, particularly for highly rated securities such as triple A-rated CMBS, encouraging an increase in their supply. This trend was also driven in part by the shallow market for lowest grade CMBS tranches[8], a chronic condition that exerts significant influence on both the public and private real estate debt markets.

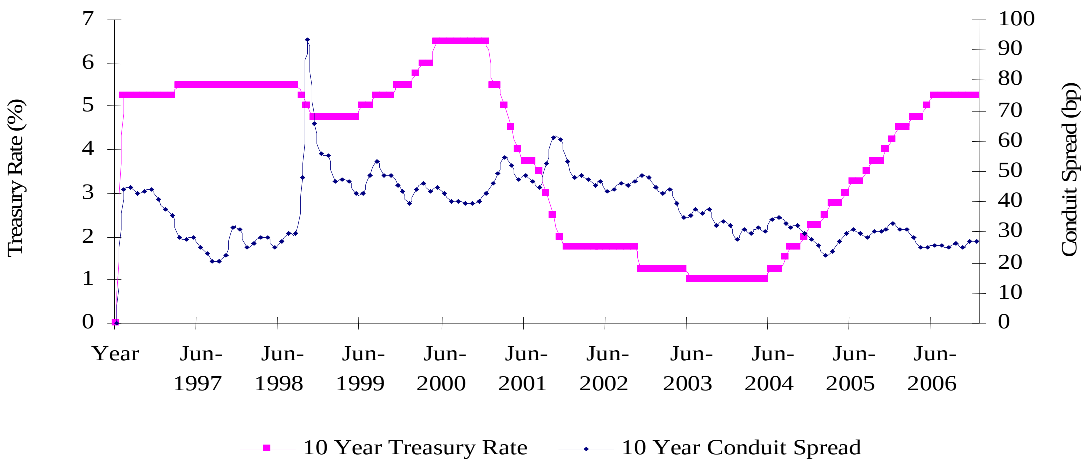
[8] Tranching involves issuance of several classes of securities against a pool of assets, each with distinct risk-return profiles.

The period, 2004 – 2006, saw a predominant issuance of floating rate notes. In 2006, 81% of the issues were floating rate notes representing an increase of 1.2% and 4.9% over 2005 and 2004 respectively.

The US CMBS market is dominated by conduit/fusion transactions[9]. In 2006, conduit/fusion transactions accounted for 88% of the outstanding CMBS issuance, and the large loan deals for the remaining 12% (Standard & Poor's 2006e). For analytical purposes, re-REMICS, CRE CDOs, and corporate-dependant deals have been included in the above two categories due to their special collateral characteristics.

Conduit transactions have had strong investor appeal as evidenced by contraction in spreads. Figure 3.6 shows the 10-year fixed conduit spreads between 1996 and 2006. The earlier years saw upward movements in annual average spreads of between 44basis points (bp), and 53bp, with the exception being 1998 which recorded a high of 111bp. However, after 2001 there has been a fall from a high of 53bp to just less than 30bp as at the end of 2006 (Commercial Mortgage Alert 2007).

Figure 3.6: 10-Year Fixed Conduit Spreads and 10-Year Treasury Rate



Source: Commercial Mortgage Alert (2006)

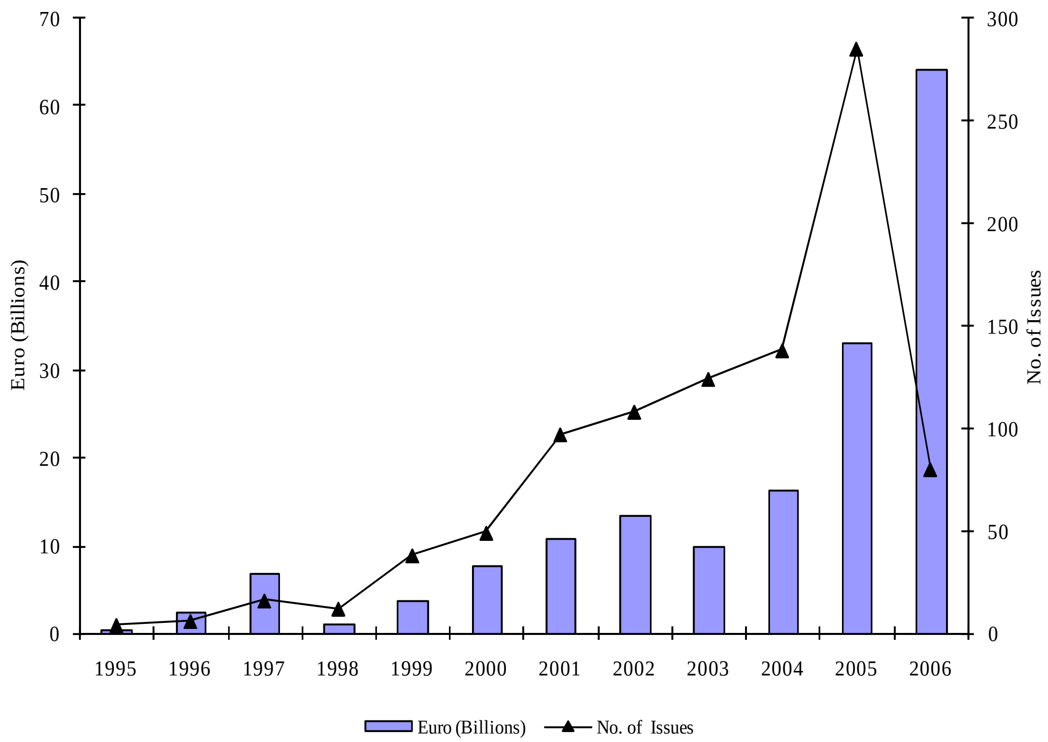
[9] CMBS backed by reasonably large, well diversified pools of small-to medium-sized and large-sized secured property loans.

According to Fitch Ratings (2007d), by the end of 2006, the ratio of upgrades to downgrades was 34:1 (the highest ratio for structured finance products). Of the nearly 5000 CMBS deals they rated, the surveillance group upgraded 1,781 tranches and downgraded 52. Credit rating upgrades depict mainly an improvement in the performance of the underlying asset backing a CMBS issue and downgrades the opposite.

3.4.2 EU CMBS Market

EU CMBS issuance in 2006 was AU$108 billion (€64.75 billion), an increase of 39% on 2005 levels despite the number of transactions decreased to 80 from 285 (Standard & Poor's 2007b). Between 1997 and 2004, more than AU$129 billion (€77 billion) was raised from 124 transactions. Figure 3.7 shows and historical overview of annual issuance.

Figure 3.7: EU CMBS Issuance 1995 - 2006



Source: Barclays Capital (2006)

The UK has been traditionally the dominant jurisdiction in EU CMBS issuance, accounting for 74% in 2004. Germany is rapidly catching up, with multifamily deals making up 23% of all CMBS and 29% of conduit deals in 2006 (Structured Finance International 2006).

In terms of asset composition for EU CMBSs, office and retail properties continued to form the dominant collateral security in 2006 at 31% and 28%, respectively. The multifamily residential sector emerged as a leading collateral security in 2006, mainly driven by securitisations of loans secured by German multifamily portfolios; it increased from 15% in 2005 to 23% in 2006 (Moody's Investor Service 2007a).

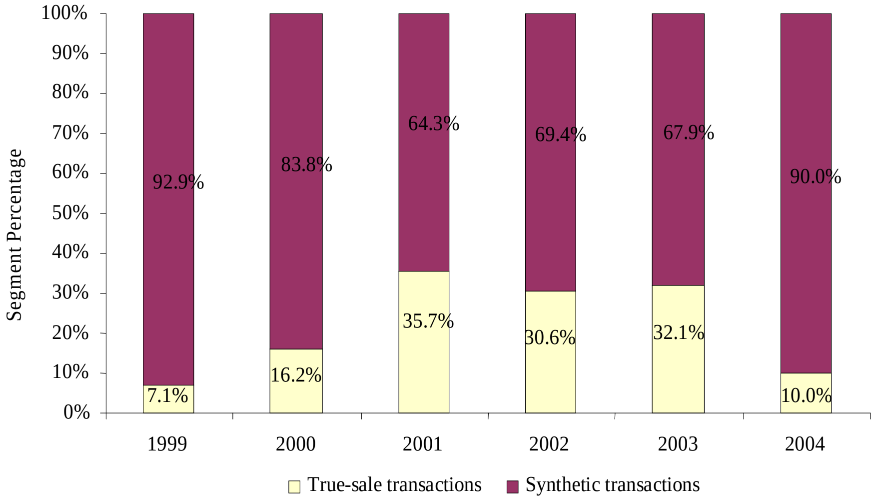
By 2005, EU CMBS issuance was largely in the AAA rating category with 60% of the total and AU$7.5 billion (€4.5 billion) worth of non-investment grade CMBS issued from 2000. Vresen (2005) points out that the majority of EU CMBS issuance from 2000 to Q1:2005 were floating notes averaging at 73%, similar to US and Australia.

No single transaction type made up a majority issuance mainly due to a wide range of legal structures to accommodate each of the transaction types. However, the single largest transaction type was the single-borrower single-property transaction with 28% of the total issuance to the end of 2004. Together the single borrower and multi borrower property categories made up 605 (68.8%) of the 879 issues as at end of 2005 (Vresen 2005). Credit tenant transactions and synthetic transactions made up the remaining 31.2% of the issues.

EU CMBS transactions are generally grouped into three segments: true-sale single borrower[10], true-sale multiple borrower[11], and synthetic transactions[12]. Figure 3.8 shows the dominance of true-sale transactions from 1999 - 2004. True-sale multiple borrower transactions comprised 68% and 42.3% of all true-sale transaction in 2003 and 2004 respectively (Moody's Investor Service 2005).

[10] True-sale borrower (single property, multiple-property, liquidating pool, credit tenant lease)
[11] True-sale multiple borrower (single property and multiple property)
[12] Synthetic transactions are typically funded through the sale of credit linked notes

Figure 3.8: EU CMBS Volume by Structure Category (1999 - 2004)



Source: Author's compilation from various Moody's Investor Service EU CMBS Year-end and Outlook Reports 1999 – 2004.

Spreads tightened by approximately 60% in the last three quarters of 2004. In July 2004 the market saw AA spreads at around 40bp, with two recent first quarter 2005 transactions closing at 17bp for the AAA classes. This implied a 57.5% tightening in AAA over the last three quarters. Furthermore, the BBB class saw spreads at 200bp in July and in the first quarter of 2005 at around 75bp. This implied a 62.5% tightening at BB over the last three quarters. As a result, the difference between AAA and BBB spreads narrowed from 160bp to only 58bp, a 64% reduction (Vresen 2005). Obviously, lower spreads mean that bond investors are not being compensated as they were for similar risk. On the other hand, it also means that costs of funds for originators and borrowers are lower, making CMBS even more attractive as a financing source.

According to Vresen (2005), EU CMBS showed the best upgrade performance in 2004 of any major EU ABS sector, with 7.6% of the ratings being upgraded. This compares with an average upgrade in EU ABS of 4.5%. The 2004 CMBS downgrade-to-upgrade ratio was 0.4, just behind residential mortgage backed securities and consumer ABS, both which saw downgrades in 2004. Moody's (2007b) reported 2006 EU CMBS upgrades at 8% and downgrades at 2.1%.

3.4.3 Asian CMBS Market

The use of CMBS as a funding source and as a balance sheet management tool is still in its infancy in most Asia Pacific countries, with notable exceptions being Japan and Singapore. Securitisation of property by owners to unlock their holdings either for liquidity and cash improvement or for the redeployment of capital to other business/investment activities has been through the setting up of property trusts or real estate investment trusts (REITs).

Several factors have contributed to the recent adoption of REIT structure investment vehicles in Asia. Low yields from capital and money market investments, desire to boost liquidity of the industrial and commercial property markets and to facilitate the sale of properties by over-extended corporations and their bankers are quoted as the main drivers of several Asian governments to pass new laws for the establishment of property trusts in their countries (Tan Y.K. 2004b).

However, according to Moody's (2006), the following impediments exist in most Asian countries for REITs to use CMBSs as a funding source:

- Contentious taxation treatments and structural arrangements which have no provision for issuance of CBMS via REITs e.g. Taiwan.
- Relaxed regulatory restrictions and abundant liquidity subduing securitisation as a funding source e.g. Hong Kong
- Lack of a developed comprehensive regulatory infrastructure e.g. Malaysia, Philippines, Thailand, Indonesia, and China.

The following is an overview of the CMBS markets in several Asian countries. Table 3.1 shows the number of CMBS issues that have been rated by Moody's Investor Services and Fitch Ratings from 2003 to December 2006. The table shows the dominance of Singaporean firms in CMBS issuance in Asia.

Table 3.1: Asian CMBSs Rated by Moody's Investor Services and Fitch Ratings 2003 – 2006

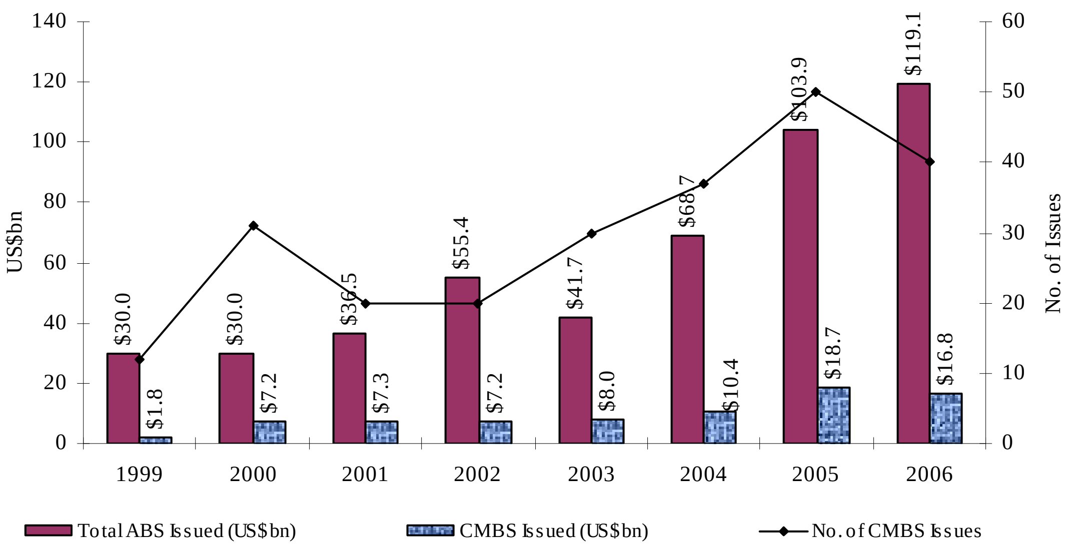
Year	Name of Issuer	Location of Assets	Assets	Class	Issuance (Millions)	Rating
2006	Star Topaz	Singapore	Mortgage on Commercial Properties	Senior	SGD650	AAA
	Silver Oak	Singapore	Mortgage on Commercial Properties	A1	US$651.6	AAA
				A2		AAA
				B		AAA
				RCF		A
	Silver Maple 2007	Sinagopre	Mortgage on Commercial Properties	Senior	EUR175	AAA
	Blossom Assets	Singapore	Mortgage on Commercial Properties		US$121	AAA
	DAD SPV	Thailand	Mortgage on Commercial Properties		THB8,200	AAA
	Dynasty Assets	China	Commercial Properties		US$145	AAA
2005	Platinum AC1 Limited	Singapore	Mortgage on Commercial Properties		€ 320	Aaa
	Orion Prime Ltd.	Singapore	Mortgage on Commercial Properties		€ 320	Aaa
	Silver Maple Investment Corporation Ltd.	Singapore	Mortgage on Commercial Properties	RCL	€ 186.20	Aaa
	Entrustment of Shin Kong Zhong Shan Building to Land Bank of Taiwan	Taiwan	Commercial Property	A	NT$873	Aaa
	Entrustment of Shin Kong Zhong Shan Building to Land Bank of Taiwan	Taiwan	Commercial Property	A	NT$1,130	Aaa
	Fubon No.1 Real Estate Investment Trust Fund	Taiwan	Commercial Property		Min NTD 4,500	Aaa
					Max NTD5,830	Aaa
	Shin Kong No.1 Real Estate Investment Trust Fund	Taiwan	Commercial Property		Min NTD 8,500	Aaa
					Max NTD11,300	Aaa
2004	CapitalRetail Singapore Limited	Singapore	Mortgage on Commercial Properties	A	€ 320	Aaa
	Silver Maple Investment Corporation Limited	Singapore	Mortgage on Commercial Properties	Series 022	US$195	Aaa
				2nd RCF	Up to S$20	Aaa
	Emerald Assets Limited	Singapore	Mortgage on Commercial Properties	P1-AAA-001	€ 144	Aaa
	Entrustment of Tong Yang Chia Hsia International Corp. IBM Building to International Bank of Taipei	Taiwan	Commercial Property	A	NT$1,630	Aaa
2003	Cobalt Asset Management	Singapore	Lease Agreements		S$45	Aaa
	Silver Maple Investment Corporation Ltd.	Singapore	Commercial Properties	Series018	US$72.1	Aaa

Source: Author's compilation from various Moody's Investor Services and Fitch Ratings Asian Structured Finance Year-end and Outlook Reports 2003 – 2006.

3.4.3.1 Japan

For the period 1999 to 2006, a total of over AU$98.3 billion (US$77.4 billion) worth of CMBSs were issued, representing nearly 16% of total ABS issuance over the same period. During 2006, 40 CMBS deals were launched in Japan, with issuance of over AU$21.3 billion (US$16.8 billion or JPY1.4 trillion), a slight decrease from 2005. This was mainly due to a decrease in significant refinancing deals that totalled approximately AU$6.1 billion (US$4.8 billion or JPY400 billion). Coupon spreads of CMBS widened during the first half of 2006, especially for 'AAA' rated notes. No transaction was downgraded in Fitch-rated Japanese CMBS deals in 2006 (Fitch Ratings 2007c). Figure 3.9 shows CMBS market issuance by amount and size as a percentage of the overall securitisation market trends from 1999 to 2006.

Figure 3.9: Japanese CMBS Issuance (1999 - 2006)



Source: Various Fitch Ratings Structured Finance Year Review and Outlook Reports 1999 - 2006

CMBSs backed by non-performing commercial property loans have played a major role in the development of multi-borrower transactions. However, single asset transactions are the dominant CMBS vehicle.

3.4.3.2 South Korea

The securitisation market in South Korea is dominated by asset backed securities mainly of consumer finance receivable-backed securities with the CMBS market largely underdeveloped. It is anticipated that with the establishment of Corporate Restructuring REITs (CR-REITs) and Korean REITs (K-REITs), the CMBS market will grow. The K-REIT is an ordinary REIT, while the CR-REIT is a special vehicle created to transform the unproductive properties of a restructured company into liquid assets.

It is anticipated that the CR-REITs and K-REITs will use CMBSs as a funding source.

3.4.3.3 Singapore

Singapore offers one of the most vibrant securitisation markets in the Asian region. The driving forces have been the improving macro-economic dynamics; favourable legal and regulatory framework; relaxed leverage requirements; stable performance of existing transactions and increased investor familiarity with specific asset types and asset managers.

Property-related transactions mainly commercial properties –are the dominant players. These transactions are either repeat issuances by established REITs or new securitisations of landmark properties. Property companies have become proficient in using CMBSs as a funding source and in balance sheet management. In 2004, 85% of the securitisation deals were by REITs compared to 70% and 75% for 2003 and 2002 respectively.

In 2006, there was a new type of asset (hotels) providing as collateral for the CMBS market. The cross-border issuance amounted to AU$1,118 billion (US$930 million) from three CMBS transactions. The CMBS originators were Keppel REIT (K-REIT), Frasers Centrepoint Trust and RCS Trust, a joint venture trust established by CapitaMall Trust (CMT) and CapitalCommercial Trust (CCT). In the CMBS originated by RCS Trust, the portfolio property was the integrated Raffles City complex which comprises a shopping centre, an office tower, a convention centre and two hotels in Singapore. This was the first CMBS involving hotel assets and the largest CMBS issuance in Asia (ex-

Japan). The proceeds from this deal were used to partly finance the AU$2.8 billion (US$2.2 billion) acquisition of the Raffles City complex by CCT and CMT. The total number of transactions remained unchanged in 2006 at four. In February 2007, CapitaMall Trust issued its fifth CMBS worth AU$292.3 billion (EU€175 million) to refinance its 2002 CMBS issue (Fitch Ratings 2007a).

3.4.3.4 Malaysia

In 2001 the Securities Commission introduced ABS guidelines which have set the regulatory and infrastructural framework for all securitisation deals including CMBSs. Authorities seek to use securitisation as a means of dealing with non-performing loans.

The country's first CMBS transaction was in 2002 sponsored by Sunway City Berhad worth AU$161 million (RM450 million).

3.4.3.5 Hong Kong

The capital markets have been awash with liquidity for the past few years subduing the securitisation market as there are cheaper financing sources (Fitch Ratings 2007a). However, the government's use of securitisation as a means to raise AU$1 billion (HK$6 billion) from future revenues from 6 government-owned toll bridges and tunnels in 2003 set the regulatory and infrastructural framework for securitisation deals. Potential is there for CMBS transactions from REITs that will be listed.

In 2006, a cross-border CMBS transaction worth AU$381 million (US$300 million) from Singapore listed Fortune REIT was concluded (Fitch Ratings 2007a).

3.4.3.6 Taiwan

The Financial Asset Securitisation Law (FASL) and the Real Estate Securitisation Law passed in 2002 and 2003 respectively set the regulatory and infrastructural framework for all securitisation deals. By the end of 2005, 35 deals worth AU$6.35 billion (US$5 billion or NTD170 billion) had been structured: 25 were financial base deals and 10 were real estate based deals. Of the 10 real estate based deals, 3 were issued by REITs and the other 7 were issued by Real Estate Asset Trusts (REATs). Total issues by

REITs amounted to AU$1.2 billion (US$ 941 million or NTD 31 billion) and AU$269 million (US$ 212 million or NTD7 billion) for four of the REATs.

The securitisation market is facing impediments in the form of certain tax treatments and structural arrangements. There is a hurdle for refinancing as there is a 6% tax on interest and a 10% tax on the difference between sale price and purchase price. REITs also have no provision to issue CMBSs.

3.4.3.7 China

Currently developments are underway for a reliable legal, regulatory and structural securitisation framework in China. The sheer size of available assets and non-performing loans shows great potential for the development of REITs. Launched in September 2006 with an issue size of AU$184 million (US$145 million), Dynasty is China's first cross-border CMBS, securing over nine retail properties located in nine cities in eastern China. It is anticipated that further issuance of cross-border CMBS backed by Chinese properties may come from Singapore- and Hong Kong-listed Chinese REITs due to the popular use by REITs of CMBS as a funding strategy. However, investors are cautious as they doubt the enforceability of China's legal framework (Fitch Ratings 2007a).

3.4.3.8 Other Countries

In Thailand, Dhanarak Asset Development's (DAD) repeat office leases-backed CMBS issuance by in 2006 at AU$280 million (THB8.2 billion) was down from the AU$341 million (THB10 billion) CMBS it had issued the previous year (Fitch Ratings 2007a).

As at December 2006, no CMBS issuance had taken place in the remaining countries in the region.

3.5 AUSTRALIAN COMMERCIAL MORTGAGE-BACKED SECURITIES

3.5.1 Background

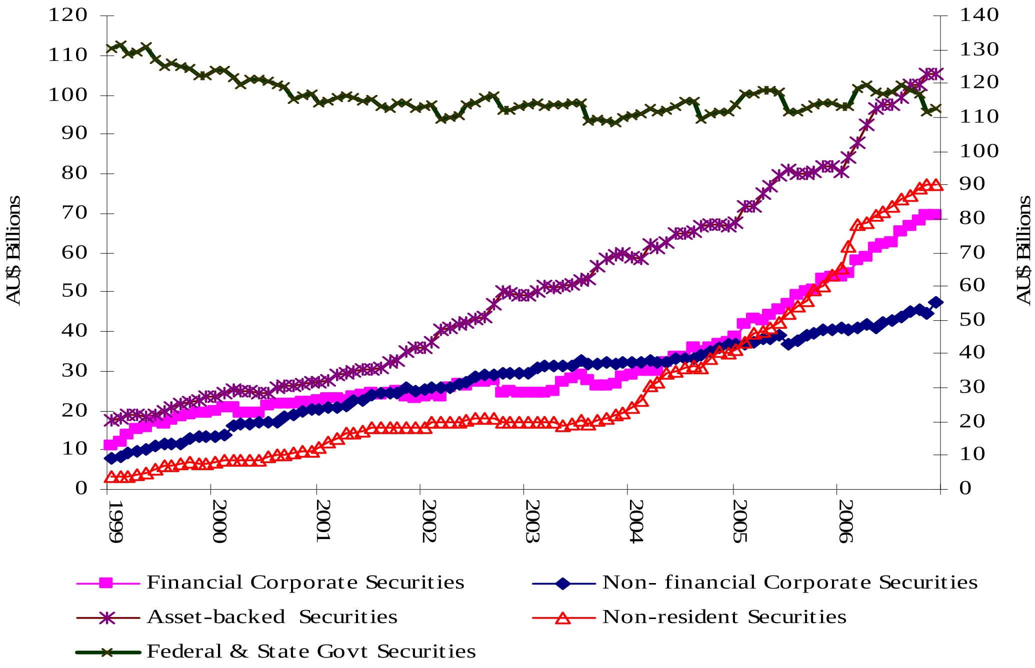
The growth of the Australian CMBS market is linked to that of LPTs. The single-purpose-vehicle-like characteristics of LPTs have helped in their establishment as major players in the CMBS market. LPTs continue to be the mainstay of the Australian CMBS market, with 65% of issuance market share. If wholesale funds are included, this figure increases to 75% (Standard & Poor's 2005b). Draffin (2002) attributed the strong interest in CMBS issuance from LPTs to the ability to achieve AAA rating matched by strong investor demand; the cost effectiveness of CMBS debt relative to traditional forms of property finance; and the potential flexibility afforded by structured CMBS debt.

Many LPTs used equity capital to fuel growth and expansion during the mid-1990's, but later switched to debt financing in 1997 when the RBA cut interest rates in the second half of 1996, which made debt financing a cheaper option to equity capital (Kavanagh 1997). Jones Jang LaSalle (2001) predicted the rise of LPT CMBSs on the premise that they had AU$16 billion debt, of which 50% was bank debt. Between 2001 and 2004, LPTs issued CMBSs worth over AU$3.7 billion via 27 issues (eg: Mirvac, Macquarie Goodman Industrial, ING Office, ING Industrial, Investa, Macquarie Office) and bonds worth over AU$4.8 billion via 40 issues (eg: Gandel, Commonwealth Property, GPT, Stockland, Westfield) (Newell & Tan 2005).

This increased participation in CMBS issuance can also be partly attributed to the high demand by institutional investors, mainly superannuation funds, for shares and bonds issued by LPTs in comparison to investing in direct property. The total contribution of asset allocation by Australian superannuation funds to property (both direct and indirect) declined from 17% in 1988 to 9% in 2000 - 2002, though the contribution of indirect property increased from 3% to 7% over the same period (InTech 2003). In 2005, 95% of superannuation funds had a specific allocation to property (either direct or indirect) averaging 10% (Newell 2006b). The introduction of compulsory superannuation in 1992 saw superannuation funds increase their total assets from AU$36 billion in June 1984 and AU$238 billion in June 2005 to AU$946 billion in September 2006 (Australian Prudential Regulatory Authority 2006). Their growth has been underpinned by strong investment returns and new contributions.

With the drop in public bond issuance, bonds and CMBSs issued by LPTs have been an attractive investment option for superannuation funds. Outstanding government securities fell from AU$130 billion in 1999 to AU$112 billion at the end of 2006. On the contrary, outstanding amounts for other debt securities; in particular asset backed securities[13] increased from AU$17.5 billion to AU$104 billion over the same period. Figure 3.10 shows outstanding debt securities from 1999 to 2006.

Figure 3.10: Outstanding Debt Securities (1999 - 2006)



Source: Reserve Bank of Australia (2007)

3.5.2 Market Structure

The overall cumulative Australian CMBS issuance since 1999 reached AU$17.5 billion at the end of 2006 (section 2.3.9.1). The three years to 2006 saw an average number of issues of eight per year, lower than the record number of issuances of fourteen in 2002. However, the size of issues has been increasing. For instance, all the new issues in 2006 each had a combined tranche value of over AU$400 million. Furthermore, the last three years have seen record issue sizes with AU$1 billion for Multiplex MPT CMBS Series

[13] These include commercial mortgage-backed securities

2005-1 & 2 in 2005 and AU$900 million for Centro Shopping Centre Securities - CMBS Series 2006-1 in 2006.

Over 2000 - 2006, the most dominant CMBS issues have been in the office sector (AU$5.2 billion), followed by the retail sector (AU$4.5 billion). The diversified sector and the industrial sector have had AU$3.4 billion and AU$1.4 billion worth of CMBS issuance respectively (Figure 1.2). Further details on some of the major properties in the portfolios backing the issues are in Table 3.2.

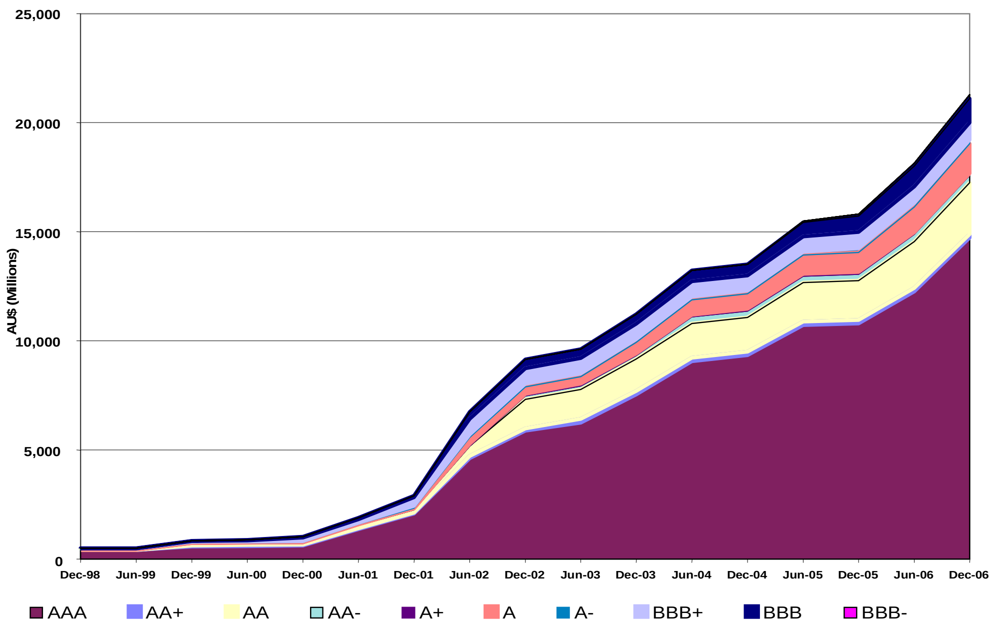
Table 3.2: Major Properties in Australian CMBS Issues by Value

Sector	Issue	Date of Issue	Major Property in Issue	Property Value (AU$ m)
Office	CPIT 2006 Aurora Bonds	Apr-01	ABN AMRO Tower	$495
Office	Deutsche Office Finance 2004-CMBS Trust	May-04	Governor Phillip Tower and Governor Macquarie Tower, Sydney NSW	$478
Retail/ Office/Hotel	Quay 62 Pty Ltd Series 2005-1	Apr-05	Collins Place, 25-55 Collins Street, Melbourne VIC	$425
Retail	Quay 62 Pty Ltd Series 2003-1	Oct-03	Southland, VIC	$350
Office	Mirvac Capital Pty Ltd	Jun-01	The Optus Centre, Miller St NSW	$330
Retail	Deutsche Office Finance 2004-CMBS Trust	May-04	Southgate Complex, Melbourne VIC	$316
Retail	Centro Shopping Centre Securities Limited - CMBS Series 2006-1	Jun-06	Centro Galleria, WA (50%) & Centro Goulburn, NSW (50%)	$299
Retail	Quay 62 Pty Ltd Series 2003-1	Oct-03	Pacific Fair, Broadbeach	$292
Industrial	Deutsche Industrial Finance 2002 - CMBS Trust	Dec-02	DB Office Park, North Ryde NSW	$103
Industrial	Macquarie Goodman Industrial Finance Pty Ltd.	Nov-01	City West Office Park, Pyrmont NSW	$93

Source: Author's compilation from various Standard and Poor's CMBS presale reports

Majority of the tranches have been A-class rated though lower B-class tranches are becoming common as well (Figure 3.11). This shows the growth/maturing of the market, increased acceptance of the investment asset and the increased participation of more knowledgeable investors (Chikolwa 2007a).

Figure 3.11: Australian CMBS Issuance by Tranche Type and Amount (1998 - 2006)



Source: Standard and Poor's(2006a)

A combination of both fixed-interest and floating-rate notes have been issued to attract a broad spectrum of investors. In the earlier years floating rate notes and fixed rate notes were issued in equal proportions. However, since 2004 floating rate notes have been dominate. For instance in 2005, 68% were floating rate notes in comparison to 32% fixed rate notes.

Majority of the issues are in the single borrower multi-property category with over 95% of the total issuance to date. The CPIT 2006 Aurora Bonds CMBS issued in April 2001 is the only single borrower single-property issuance to date being for a single Sydney CBD office property. There have been two multi-borrower multi-property issues, MCS Capital Pty Limited issued in May 2002 and Challenger Capital Markets Ltd issued in

June 2002. ALE Finance Company Pty Ltd - Series 1 CMBS issued first in November 2003 and its tap issue[14] in April 2006, is the only whole-business CMBS to date. Whole business securitisation (WBS) is a structured financing technique that involves the securitisation of the future cash flows of an entire business or business unit, rather than a discrete pool of existing revenue generating assets.

The year 2006 saw the introduction of the first Australian conduit-style CMBS common in the US, Centro Shopping Centre Securities Ltd, CMBS Series 2006-1. This AU$900 million transaction is the securitisation of a portfolio of 13 non cross-collateralised and non cross-defaulted real estate backed debt facilities to 12 obligators. Each financing is backed by between 1 and 11 retail properties located in major Australian cities and regional centres. The total independent value of the assets backing the issue was AU$1.67 billion. Table 3.3 presents examples of the various Australian CMBSs by transaction type. The diversity of issuance transaction types show the maturity of the market as well as the issuer’s confidence in trying out various CMBS structures to suit market needs. These deals are structured on a ‘secured loan’ basis unlike other parts of the world where they are done on a ‘true-sale’ basis[15]. A possible explanation is the predominance of LPTs in the CMBS market, having a 65% market share (Standard & Poor's 2005b). LPTs’ core business is real estate investment and retaining control of the securitised assets is critical to their survival.

[14] Issuance of additional securities in an existing CMBS structure within credit rating agency set loan-to-value and debt service coverage ratio limits.

[15] A “secured loan structure” involves “selling” assets to a special-purpose “bankruptcy-remote” entity that, in turn, pledges the assets as collateral for a loan and then conveys the borrowed funds to the “seller” as consideration.

Table 3.3: Examples of Australian CMBS by Transaction Type

No.	*Issue Date*	*Sector*	*Issue*	*Transaction Type*	*S&P Rating*	*Issued Amount (AU$m)*	*Coupon Type*	*Coupon/ BBSW+*	*Scheduled Maturity*	*DSCR***	*LTV***	*Security*
1	Apr-01	Office	CPIT 2006 Aurora Bonds	Single-borrower single-property	Aaa*	150	Floating	41	Mar-06	2.0	32%	ABN AMRO Office Tower with a total portfolio value of AU$713 million
2	Jun-01	Diversified	Mirvac Capital Pty Ltd - Series 2001-1	Single-borrower multi-property	AAA	150	Fixed	6.50%	Jun-06	2.2	40%	25 modern, investment-grade buildings in the office, hotel, retail, industrial & carpark sectors with a total portfolio value of AU$1,430 million
					AAA	350	Floating	41	Jun-06	2.2	40%	
3	Feb-02	Office	ING Office Finance Pty Ltd	Single-borrower multi-property	AAA	230	Fixed	6.25%	Feb-07	2.4	39%	18 commercial office properties with a total portfolio value of AU$1,215 million
					AAA	178	Floating	40	Feb-07	2.4	39%	
4	Jun-02	Diversified	Challenger Capital Markets Ltd	Multi-borrower multi-property	AAA	100	Fixed	6.00%	Jun-05	2.7	32%	25 retail, office, industrial, cinema and car park properties with a total portfolio value of AU$798 million
					AAA	120	Floating	40	Jun-05	2.7	32%	
					A	61	Fixed	6.50%	Jul-05	1.8	48%	
					A	54	Floating	80	Jul-05	1.8	48%	
					BBB+	55	Floating	100	Jul-05	1.5	56%	
					BBB	17	Fixed	6.75%	Jul-05	1.4	60%	
					BBB	10	Floating	130	Jul-05	1.4	60%	
					NR	99	Floating	P	Jul-05	2.7	32%	
5	Nov-03	Retail	ALE Finance Company Pty Ltd - Series 1	Whole-business	AAA	100	Fixed	6.60%	Nov-08	3.1	43%	101 pub assets with a total portfolio value of AU$562 million
					AAA	110	Floating	47	Nov-08	3.1	43%	
					AAA	45	Floating	90	Nov-08	2.2	60%	
					AAA	35	Floating	120	Nov-08	1.8	71%	
					AA	40	Floating	67	Nov-08	2.6	51%	

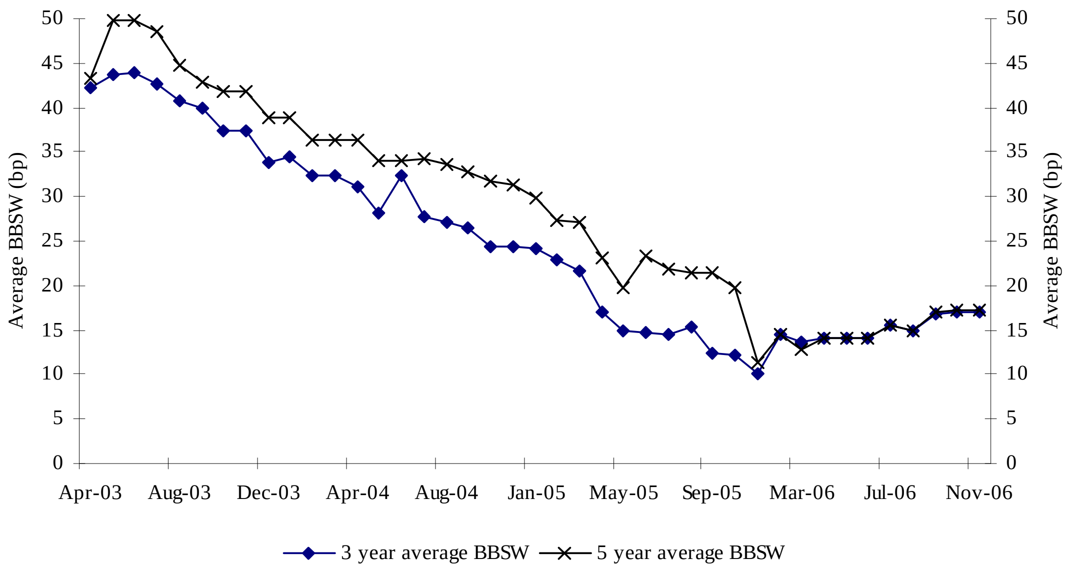
No.	Issue Date	Sector	Issue	Transaction Type	S&P Rating	Issued Amount (AU$m)	Coupon Type	Coupon/ BBSW+	Scheduled Maturity	DSCR**	LTV**	Security
6	May-05	Office	Multiplex MPT CMBS Series 2005-1	Single-borrower multi-property	AAA	343	Floating	20	May-08	2.0	40%	8 commercial properties with a total portfolio value of AU$932 million
					AA	61	Floating	30	May-08	1.7	47%	
					A	54	Floating	40	May-08	1.5	53%	
					BBB	51	Floating	57	May-08	1.4	59%	
					BBB-	28	Floating	80	May-08	1.3	62%	
7	May-05	Diversified	Multiplex MPT CMBS Series 2005-2	Single-borrower multi-property	AAA	298	Floating	25	May-10	2.0	40%	5 commercial and 4 retail properties with a total portfolio value of AU$804 million
					AA	53	Floating	40	May-10	1.7	47%	
					A	39	Floating	50	May-10	1.5	52%	
					BBB	52	Floating	75	May-10	1.4	59%	
					BBB-	21	Floating	90	May-10	1.3	62%	
8	Dec-06	Office	Series MCWF 2006-1	Single-borrower multi-property	AAA	320	Floating	19	Jun-11	1.8	44%	52 retail centres with a total portfolio value of AU$802 million
					AA	50	Floating	23	Jun-11	1.5	51%	
					A	25	Floating	27	Jun-11	1.5	54%	
					BBB	30	Floating	47	Jun-11	1.4	58%	
					BBB-	15	Floating	57	Jun-11	1.3	60%	
9	Dec-06	Office	WOT CMBS Pty Ltd Series 1	Single-borrower multi-property	AAA	320	Floating	26	May-11	N/K	N/K	2 office buildings, 1 retail building and 1 university building with a total portfolio value of AU$1,088 million
					AA	45	Floating	31	May-11	N/K	N/K	
					A	90	Floating	41	May-11	N/K	N/K	
					BBB	50	Floating	61	May-11	N/K	N/K	
10	Dec-06	Retail	Centro Shopping Centre Securities - CMBS Series 2006-1	Conduit	AAA	250	Floating	19	N/K	1.8	43%	13 mortgage facilities secured against 47 retail properties and 1 retail distribution centre with a total portfolio value of AU$1,580 million
					AAA	300	Floating	24	N/K	1.8	43%	
					AAA	170	Floating	18	N/K	1.8	43%	
					AA	37	Floating	28	N/K	1.8	45%	
					A	62	Floating	40	N/K	1.8	49%	
					BBB	53	Floating	65	N/K	1.8	52%	
					BBB-	28	Floating	85	N/K	1.8	54%	

Key:
N/K: Non-known; P: Private

Source: Author's compilation from various Standard and Poor's CMBS presale reports

Given the general appetite for fixed-income securities and the limited supply in the market, CMBS credit spreads were contracting until the end of 2005 and have been stable since the start of 2006 as shown in Figure 3.12. In 2005, 'AAA' five-year, interest only notes were priced at 20 – 25 bps over three month bank bill swap rate (BBSW), and three-year, interest-only notes at 17 – 20 bps over three-month BBSW. 'BBB' were priced at 60 – 95 bps over BBSW. These margins were lower than those of 2002, when they were priced at least 20 bps wider for 'AAA' and 60 bps wider at 'BBB' level. At the beginning of 2006, both 'AAA' five-year and 'AAA' three-year were trading at average ranges of 8 – 10 bps; as at the end of 2006 they were trading at average ranges of 15 – 17 bps. With the shutting down of the CMBS market in Q3:2007, AAA spreads are predicted to be around 60 -80 bp. This is discussed more fully in chapter eight.

Figure 3.12: AAA Rated CMBS - Average Industrial Spread to Swap (April 2003 - November 2006)



Source: Author's compilation from various Property Australia magazines 2003 – 2006.

From 2003 - 2006, there were more upgrades than downgrades by credit rating agencies buoyed by improvements in property performance. Stable property markets continue to be reflected in steady cash flows and occupancy trends. No rating changes were experienced throughout the second half of 2005. Of the six rating changes in 2006, three upgrades resulted from improved property performance and the three downgrades resulted from lowering of a support party rating such as financial guarantors. The year 2006 also had fifteen rating affirmations (Standard & Poor's 2007c). Table 3.5 shows the total number of upgrades and downgrades between 2003 and 2006.

Table 3.5: CMBS Upgrades and Downgrades

Year	Upgrades	Downgrades	No. of Ratings
2003	1	1	135
2004	4	0	136
2005	0	1	134
2006	3	0	136
Total	8	2	541

Source: Standard and Poor's (2006a)

3.5.3 Future Outlook

The following supports the continued dominance of LPTs in CMBS issuance:

- Their structure and single-purpose nature have been well established and accepted in the market. Only about a third of the 48 LPTs have issued CMBSs. The others have yet to utilise CMBSs as a funding source.
- Of the AU$116 billion (68% market coverage) institutionally owned property in Australia, LPTs contribute AU$75 billion (61% of total) (Higgins 2006). These assets are best suited for securitisation due to their high capital values and stable cash flows.
- The low gearing levels in comparison to the US (Newell & Tan 2005) present possibility for further issuance of debt securities via CMBS. Australian LPTs had an average gearing level of 42.1%, whereas their US counter-parts (equity Real Estate Investment Trusts) had levels higher than 50% (BDO Chartered Accountants & Advisers 2006).
- The provision to buy and sale collateral assets in CMBS portfolios supports market growth through 'tap' issuances. In 2006, over 80% of activity came from tap issues, refinancing and restructurings from existing sponsors (Efrat 2006).

- The insatiable demand alluded to earlier by superannuation funds for fixed income securities issued by LPTs.

Many industry experts are divided on the role that unlisted property trusts will play in growth of the CMBS market (Efrat 2006). Some contend that unlisted property trusts have become sophisticated and have outgrown their existing financing mechanisms and that CMBS are an alternative debt funding tool for them. However, other industry experts have highlighted that the higher unlisted property trust gearing levels would entail issuance of lower rated tranches, for example, double B and lower which are not favourable for both issuers and investors due to the increased level to repayment risk.

The launch of Centro Shopping Centre Securities - CMBS Series 2006-1 in 2006 marked a milestone in the Australian CMBS market. Being the first such multi-borrower program in Australia, it is anticipated that momentum for other similar issues will come from small to medium enterprises and the loans this sector has sitting on bank's books, most of which have not historically been securitised. As at June 2006, total commercial property exposure by all Australian banks was AU$94.5 billion, with 0.4% and 0.2% classified as nonperforming and impaired[16] respectively (Reserve Bank of Australia 2006). Banks have generally been reluctant to securitise their commercial property loans due to the low default rates (Table 2.17).
dominance as issuers.

The strong commercial real estate market outlook should support future CMBS issuance. Investors in real estate were rewarded with strong returns with both direct property and LPTs outperforming shares and bonds over a ten-year period to Q4:2006 (Newell 2007b). Though there was been a strong surge in returns on shares over one year to Q3:2007 (see Table 2.2 in chapter 2), favourable real estate returns are still leading to sustained demand for real estate as evidenced by continued yield compression. Figure 2.1 in chapter 2 shows yield trends in retail, office and industrial sectors from 1991 to 2006. These trends are expected to continue due to the limited number of 'investment-

[16] Assets on which payments are in arrears by more than 90 days or otherwise doubtful and the amount due is not well covered by the value of collateral. The remainder of these assets were in arrears, but were well covered by collateral.

grade' properties (Murdoch 2004) and the huge amounts being allocated to property investment, as alluded to earlier.

The future outlook of various property sectors is positive: there is strong economic outlook and investor sentiment for industrial property (Jones Lang LaSalle 2007c; Newell 2007b). There are continued catalysts to growth in retail property of strong rental growth, stable income streams, favourable planning environment limiting new supply and undue competition, and strong investor support (Burdekin & Snoswell 2004). Further, office market growth is underpinned by strong economic growth. Australia was ranked twelfth on World Competitiveness Scorecard (IMD 2007) and nineteenth on the Global Competitiveness Index (World Economic Forum 2007) in 2007 and Sydney ranked at 46 in CB Richard Ellis' Global Market Rents Report of November 2006 (CB Richard Ellis 2006). Perth, Brisbane, Melbourne and Sydney also featured prominently among major Asia-Pacific cities in Jones Lang LaSalle's Asia Pacific Property Digest (Jones Lang LaSalle 2007a). Generally, office markets across Australia have performed well, with record sales activity and rental growth in Perth and Brisbane.

3.6 SUMMARY

The chapter shows how CMBSs, which were non-existent before 1990, have grown into one of the most dynamic and fastest-growing capital market sectors. This growth is not only particular to the US, but also to the EU and Australia. In 2006, there were record CMBS issuances in US, EU and Australia, signifying its importance as a major commercial property debt funding/investment instrument. However, the use of CMBS as a funding source and as a balance sheet management tool is still in its infancy in most Asia Pacific countries, with notable exceptions being Japan and Singapore.

Whilst the US has been the market leader in terms of issuance volumes and diversity of asset classes backing the issues, the EU and Australia have not lagged far behind and have replicated the US CMBS model to suit their local needs. In comparison to the larger US and EU CMBS markets, the Australian CMBS market is well matured as seen by the diversity of property types backing the issues and transaction types, tightening spreads, and record issuance volumes. Although the Australian CMBS market has "shut-down" with the advent of the credit squeeze in the financial markets, the strong commercial real estate market outlook should support future CMBS issuance, with Listed Property Trusts (LPTs) continuing their dominance as issuers.

The next chapter takes an in-depth look at how various Australian CMBSs have been structured as case studies. These case-studies are randomly selected on the basis of diversity of property classes backing the issues and on other special features incorporated in the issues.

CHAPTER 4

CASE STUDIES ON AUSTRALIAN COMMERCIAL MORTGAGE-BACKED SECURITIES

4.1 BACKGROUND

Six case studies are presented to signify how the Australian CMBS market has evolved and to show the diversity of the CMBS issues. The case studies are randomly selected on the basis of diversity of property classes backing the issues and on other special features incorporated in the issues.

4.2 JUSTIFICATION OF CASE STUDY METHODOLOGY

Case studies are a preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin 1994). Eisenhardt (1989) also supports the use of case studies in new research areas or research areas for which existing theory seems inadequate. The case studies presented here are both exploratory and explanatory. The methodology has been used in other CMBS (Ooi et al. 2003; Sing et al. 2004b) and ABS studies (Fan et al. 2004) in the Asia-Pacific region. CMBS is a sub-asset class of ABS.

The case study description, report or story is used as an analytic strategy for within case analysis to highlight how CMBSs have been structured. Emerging themes throughout the data analysis process illustrate the entire strategic actions involved in the structuring process as well as critical success factors. Furthermore, pattern or theme matching, through comparing the emerging themes with patterns derived from the literature review, is utilised (Yin 1994).

In cross-case analysis, categorising the case studies based on the size and type of CMBS issue such as larger issues vs. smaller issues, diversified property-backed issues vs. specific property-backed issues, single borrower multi-property vs. single borrower single-property or conduit or whole business, followed by searching for similarities and differences between the categories, is adopted as an analytical strategy for identifying cross-case patterns (Eisenhardt 1989).

4.3 COMMON STRUCTURAL MECHANISMS IN AUSTRALIAN CMBS

Some of the common structural mechanisms in Australian CMBSs found in all the selected case-studies are:

- *Soft bullet securities*: The Notes issued are usually interest-only with no amortisation of principal until the Scheduled Maturity Date. If no refinance is available at the time, the transaction moves into a refinancing period or "tail period" during which the properties will be sold under the security trustee's direction. The most common tail period used is 18 months, though 24 months has also been used depending on the property class backing a CMBS issue.
- *Further indebtedness*: Transactions can be structured to allow the Special Purpose Entity to raise further rated (or unrated) debt secured by the collateral, if the debt is raised and rated within existing gearing limits and/or subject to confirmation that the further issue of notes will not have an adverse rating effect on the existing notes. These are referred to as "tap issues".
- *Right to deal in properties*: The transactions can be structured to allow the SPE to both acquire further properties as well as dispose of existing properties either within an agreed criteria (usually by maintaining a gearing cap requirement) in the period prior to Scheduled Maturity Date or subject to confirmation from the rating agency that there will be no adverse impact to the rating of the Notes.
- *Insurance:* The SPE may be required to hold one or more of the following (1) Industrial Special Risks Insurance which may include Acts of Terrorism and (2) Public Liability Insurance. For rated CMBSs , the credit rating agencies demand that:
    - At least 45% of the insured amount is insured by an insurer with a credit rating not less than one rating category below the highest rated Notes on issue.

- The remainder of the insured amount is insured by an insurer with a credit rating which is not less than two rating categories below the highest rated Notes on issue.

- *Secured loan structure*: The predominant CMBS transaction structure in Australia is a 'secured loan' unlike other parts of the world where they are done on a 'true-sale' basis. Secured loan structures involve "selling" assets to a special-purpose "bankruptcy-remote" entity that, in turn, pledges the assets as collateral for a loan and then conveys the borrowed funds to the "seller" as consideration. A possible explanation of this market practice is the predominance of Listed Property Trusts as issuers of CMBSs, having a 65% market share (Standard & Poor's 2005b). LPTs' core business is real estate investment and retaining control of the securitised assets is critical to their survival.
- *Liquidity facility*: This covers interest shortfalls and amounts necessary to preserve and protect the mortgage collateral. The standard has been to allow for six months' of note payments at the credit rating agency's refinance constant for six months' of transaction expenses.
- *Hedging mechanism*: The collateral and/or note cash flows may be hedged with interest rate swaps or other derivative instruments to manage the fixed-floating rate exposures.
- *Maintenance and capital expenditure reserve*: Sufficient and regular expenditure is necessary to ensure that collateral quality, occupancy and value are maximised. A capital expenditure reserve may be required to ensure sufficient funds are available to cover any major capital expenditure works during the life of the transaction. Capital expenditure requirements may also be addressed via a facility from an appropriately rated counterparty.
- *Cross-collateralisation:* In cross-collateralisation or cross-defaulted pools of properties, the cash flow of each property before debt service jointly supports the entire pool, a default on one property triggers a default on the entire pool and total liquidation proceeds from each and all the properties are available to repay the debt. Cross-collateralisation is powerful tool in reducing volatility of cash flows. To the extent the performance of the crossed assets is not 100% correlated, the cash flow and asset value volatility of the assets is reduced.

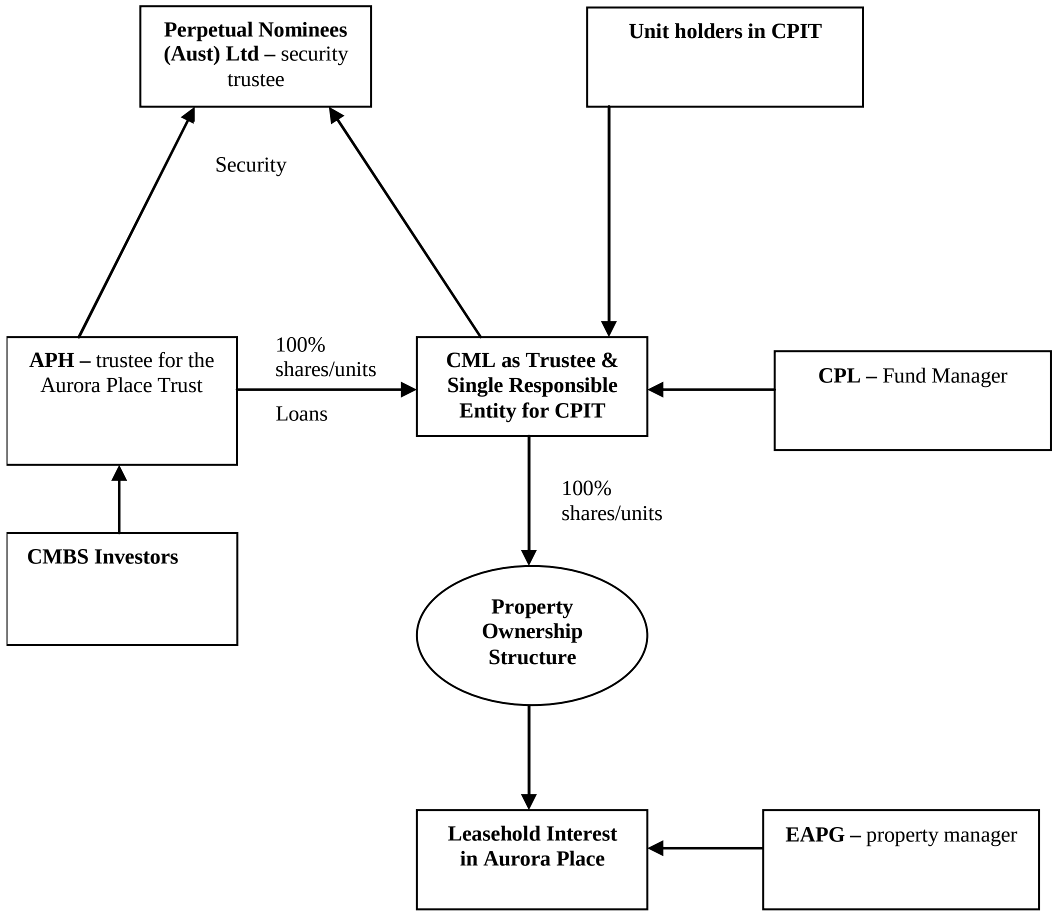
4.4 CASE STUDY ONE: CPIT 2006 AURORA BONDS

In March 2001, Commonwealth Managed Investments Ltd (CMIL), as responsible entity for the Commonwealth Property Investment Trust (CPIT), an unlisted registered managed investment scheme with the Australian Securities and Investments Commission (ASIC), issued Aaa-rated CMBSs worth AU$150 million. CMIL is a wholly owned, but not guaranteed, subsidiary of the Commonwealth Bank Australia. The asset backing the issue was a single premium grade office building known as “ABN AMRO Tower” and retail stratum, collectively known as “Aurora Place” shown in Figure 4.1.

Figure 4.1: ABN AMRO Tower, Sydney NSW

Figure 4.2 shows the CPIT 2006 Aurora Bonds transaction structure. Aurora Place Holdings Pty Ltd (APH), a special purpose company wholly-owned by CPIT, acted as trustee of Aurora Trust and was set up for the sole purpose of raising debt finance and providing loans to CPIT. The proceeds from the securities issued were ultimately used to repay an existing bridging finance facility provided by ABN AMRO. CPIT Trustee used the debt finance, together with equity funds, to acquire the property ownership structure.

Figure 4.2: CPIT 2006 Aurora Bonds Transaction Structure



Source: Moody's Investor Service (2001b)

Details of the CPIT 2006 Aurora Bonds issue are shown in Table 4.1.

Table 4.1: CPIT 2006 Aurora Bonds Issue

CPIT 2006 Aurora Bonds				
Issue Date:	March 2001			
Term-to-Maturity:	5 years			
Property Type:	Premium grade office building and retail stratum.			
Size:	49,650 m²			
Aggregate Market Value:	AU$470m			
Issue Size:	AU$150m			
Tranche:	AMOUNT	LTV	DSCR	BBSW
Aaa	AU$150m	31.7%	2.04	41bp
Interest Type	Floating with fixed interest swap			
Occupancy Rate	83.2%			
Weighted Average Unexpired Lease Term:	8 years			
Liquidity Facility:	AU$10m or 6.7% of issued debt			
Refinance Constant:	9.5%			
Largest Tenant (Share of Net Lettable Area):	34%			
Top 5 Tenants (Share of Net Lettable Area)	79.9%			
Herfindahl Property Type Index (HHPT)∗:	1.000			
Herfindahl Geographic Region Index (HHGR)∗:	1.000			

∗HHPT measures the risk of exposure by the largest single property by value in a portfolio and HHGR measures the risk of geographical concentration of the assets in a portfolio. Details of the calculation of these formulas are shown in chapter five.

Source: Author's compilation from Moody's Investor Service (2001b).

In line with Fitch Ratings (2001) and Moody's Investor Service (2001b), the following are deduced as strengths, weaknesses and mitigants of the issue:

i) Strengths:

- Premium, newly constructed office building located in the Sydney central business district (CBD).
- Excellent location within the CBD, with access to all means of transportation (bus, ferry, train motorway).
- High quality tenancy with mostly long-term leases. The average lease maturity period of 8 years was in excess of the final maturity period of 5 years.
- The conservative LTV afforded by the collateral at 31.7% and DSCR of 2.04x.

- Working capital facility of AU$10 million to cover free rent periods and other rent concessions.
- The fixed-rate swap agreement entered into by the issuer to mitigate interest rate volatility during the term of the transaction until the scheduled maturity date.
- Single tranche issuance.
- Experienced, responsible entity.

ii) Weaknesses:

- Concentration of a single property in a single property sector shown by HHGR and HHGR of 1, respectively.
- Two largest tenants occupy 62.4% of the net lettable area.
- The property had not yet stabilised, with occupancy rate at approximately 83%.
- Liquidity support was heavily dependent on rentals being collected on a timely manner.

iii) Mitigants:

- The asset is located in Australia’s most populous city in the heart of the core CBD Sydney office market and is pre-eminent in its class.
- On a joint probability basis, the likelihood of two high credit quality tenants defaulting was considered remote. In addition, the availability of the bank guarantee allowed the issuer to meet interest payments and to find replacement tenants in a reasonable timeframe, should a major tenant default.
- Rent from tenants was paid directly to a trust account controlled by the property manager and monitored by the CPIT trustee.

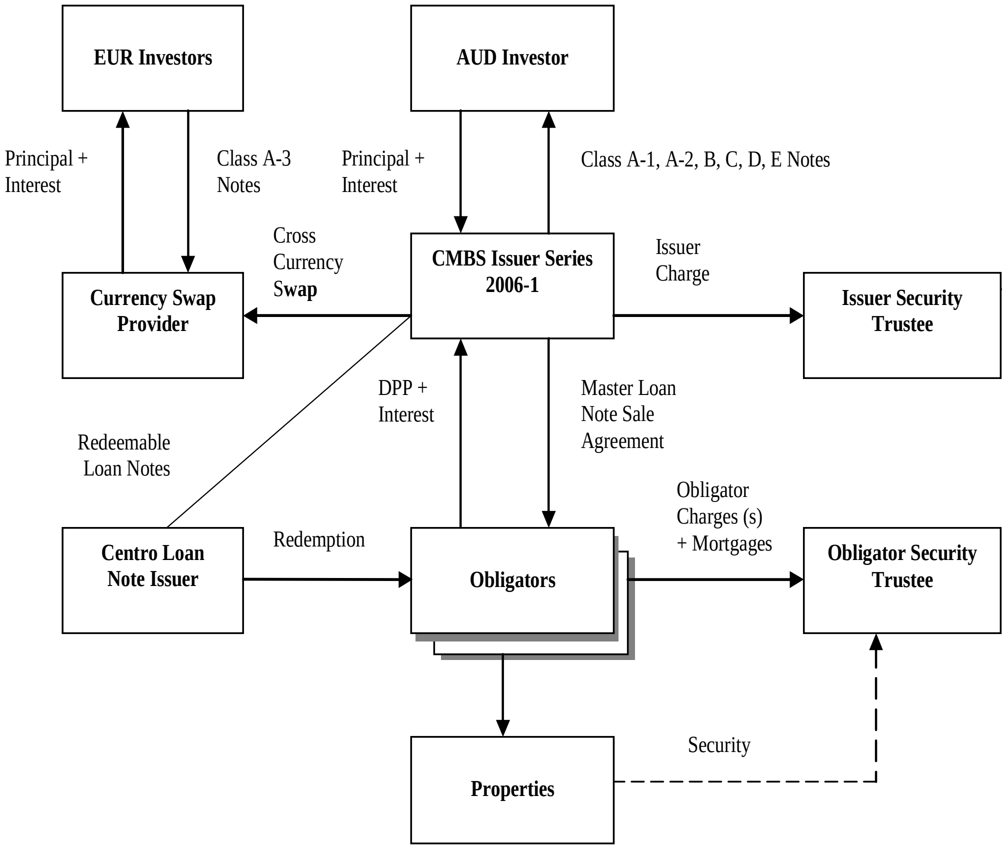
To date, the CPIT 2006 Aurora Bonds issue is the only single-borrower single-property transaction to have been done in Australia. The issue successfully closed in September 2007. CPIT got a syndicated loan to cover the balloon payment.

4.5 CASE STUDY TWO: CENTRO SHOPPING CENTRE SECURITIES LTD, CMBS SERIES 2006-1

In a first for the Australian market, Centro Properties Group ("Centro") established in December 2006 a conduit for the securitisation of pools of payment obligation which are ultimately secured by commercial properties. This is similar to multi-loan conduit programs common in the US. The transaction is the securitisation of a portfolio of thirteen real estate backed financings to twelve obligors (Centro and its associated direct property vehicles) (Figure 4.3). Each financing is backed by between one and eleven retail properties located in major Australian cities and regional centres. The proceeds of the issue totalling AU$899.8 million were used to refinance bank debt facilities and for general working capital.

Centro is a retail property investment organisation specialising in investment, management and development of shopping centres and is listed on the Australian stock exchange. Currently, Centro's portfolio includes properties in Australia, New Zealand and the US valued at approximately AU$15.8 billion. Centro has previously issued CMBS under Centro Capital Pty Limited and MCS Capital Pty Limited with over AU$1 billion outstanding.

Figure 4.3: Centro Shopping Centre Securities Ltd. CMBS Series 2006 - 1 Structure



Source: Standard and Poor's (2006c)

Details of the Centro Shopping Centre Securities Ltd. CMBS Series 2006-1 issue are shown in Table 4.2. The issue had a depth of seven tranches from AAA to BBB-, with one AAA tranche denominated in Euro's targeting European investors. A cross currency swap was entered into with BNP Sydney to swap the Euro notes with Australian dollars.

Table 4.2: Centro Shopping Centre Securities Ltd. CMBS Series 2006 - 1 Issue Details

Centro Shopping Centre Securities Ltd - CMBS Series 2006-1				
Issue Date:	December 2006			
Term-to-Maturity:	3-5 years			
Property Type:	13 mortgage facilities secured against 47 retail properties and 1 bulky goods centre.			
Size:	669,154 m²			
Aggregate Market Value:	AU$1,670.14m			
Issue Size:	AU$899.6m			
Tranche:	AMOUNT	LTV	DSCR	BBSW
AAA	AU$250m	43.1%	1.7	19bp
AAA	AU$300m	43.1%	1.6	24bp
AAA	AU$170m (EUR €100m)	43.1%	1.6	18bp
AA	AU$37.0m	45.3%	1.6	28bp
A	AU$62.0m	49.1%	1.4	40bp
BBB	AU$52.6m	52.2%	1.4	65bp
BBB-	AU$26.0m	53.9%	1.3	85bp
Interest Type:	Floating rate			
Occupancy Rate:	98.6%			
Weighted Average Unexpired Lease Term:	5.9 years			
Liquidity Facility:	AU$42m or 4.7% of issued debt			
Refinance Constant:	8-11%			
Largest Tenant (% of Net Income):	17.8%			
Property Diversity (Largest single exposure):	AU$299m or 17.9% of portfolio value			
Net Income from Top 5 Tenants:	38.6%			
Geographic Diversity:				
New South Wales	29%			
Queensland	18%			
Western Australia	22%			
Victoria	14%			
South Australia	16%			
Herfindahl Property Type Index (HHPT):	1.000			
Herfindahl Geographic Region Index (HHGR):	0.210			

Source: Author's compilation from Standard and Poor's (2006c)

Further details of the portfolio's backing the issue are shown in Table 4.3. The portfolio, though sector specific with an HHPT of 1, is well diversified in terms of property sub-class having a discount department store, neighbourhood shopping centres, liquor outlets, a warehouse distribution centre, and regional and sub-regional shopping centres. Majority of the properties are anchored by investment grade tenants, with the largest tenant contributing 17.8% of net income and the top 5 tenants contributing 38.6% of net income. The average occupancy rate of the portfolio is 98.6%.

Table 4.3: Centro Shopping Centre Securities Ltd. CMBS Series 2006 - 1 Property Portfolios

Syndicate Name	No. of Properties	Property Type	Facility Term (Years)	Facility Required (AU$m)	Net Passing Income (p.a) (AU$m)	Occupancy Rate (%)	Market Value (AU$m)
CMCS 10	3	Discount department store, sub-regional and neighbourhood shopping centre(SC)	3	45.17	6.5	98.8	93.03
CMCS 17	11	Eight liquor outlets, sub-regional SC, two neighbourhood SCs	3	64.15	9.5	99.9	130.80
CMCS 18	4	Neighbourhood SCs	3	31.42	4.8	99.8	60.97
CMCS 21	1	Regional SC	3	73.64	9.9	99.8	162.98
CMCS 22	1	Warehouse distribution center	3	16.22	4.6	100.0	39.50
CMCS 23	1	Sub-regional SC	5	21.73	2.8	100.0	37.00
CMCS 25	5	Four neighbourhood SCs, one sub-regional SC	5	41.11	7.4	99.6	96.58
CMCS 26	3	Freestanding supermarket, sub-regional SC, bulky goods center	5	54.42	8.6	100.0	120.65
CMCS 27	1	Sub-regional center	4	54.02	6.2	100.0	89.00
CMCS 34	7	Neighbourhood SC	5	72.50	9.0	99.8	111.55
CMCS 37	6	Five neighbourhood SCs, one bulky goods center	5	98.90	10.3	99.2	148.70
CER Conduit 1	2	One regional SC, one neighbourhood SC	4	171.08	17.2	99.8	299.00
CER Conduit 2	5	One regional SC, five neighbourhood SCS	3	155.44	15.7	99.6	280.40
Total	**48**			**$899.80**	**$112.5**	**98.6%**	**$1,670.14**

Source: Standard and Poor's (2006c)

Some of the properties backing the issue are shown in Figure 4.4.

Figure 4.4: Centro Shopping Centres: Centro Galleria and Centro Colonnades

Centro Galleria – Part of CER Facility 1

Centro Colonnades – Part of CER Facility 2

In line with Standard and Poor's (2006c), the following are deduced as strengths, weaknesses and mitigants of the issue:

i) Strengths:

- Well diversified portfolio in terms of debt facilities (13 facilities to 12 obligators), underlying real estate (50 underlying property interests in 48 unique properties) and facility maturity.
- Underlying real estate security consists of 47 well located retail facilities and 1 bulky goods centre, with an HHGR of 0.210.
- Well diversified tenant pool; the largest tenant represents 17.8% of net income. The average lease maturity period of 5.9 years was in excess of the maximum final maturity period of 5 years.
- The transaction benefits from staggered maturity dates of the facilities with maturity of the underlying facilities being spread over 3 years (years 3 to 5) with the maximum maturity by facility size occurring in any single year being 41% in year three.
- The transaction benefits from a professional asset manager with a strong track record in the retail sector whose interests are tightly aligned to those of noteholders.

ii) Weaknesses:

- Each financing, with the exception of the CER Facility 1 and CER Facility 2, are not cross collateralised with other facilities and as a result noteholders could be adversely impacted by a single obligator default.
- Interest swaps are undertaken at the obligator level and in each case are entered into with an unrated counterparty in CPT.
- DSCR and LTV for each facility varies widely from 1.3x to 1.7x and 43.1% to 53.9%, respectively. The default of a single facility could cause a default on one or more classes of notes.

iii) Mitigants:

- The notes have been sized on an individual basis and do not rely on cross collateralisation for credit protection.
- While interest rate hedging is done at the obligator level with an unrated counterparty, strict parameters have been placed on each obligator requiring them to find alternate hedging arrangements should conditions change and for the swap counterparty to cash collateralise the swap should rates rise above 7.5%.
- Market risk on issuer cash flows is mitigated by the provision of an AU$42 million liquidity facility, covering 8 months of note payments.

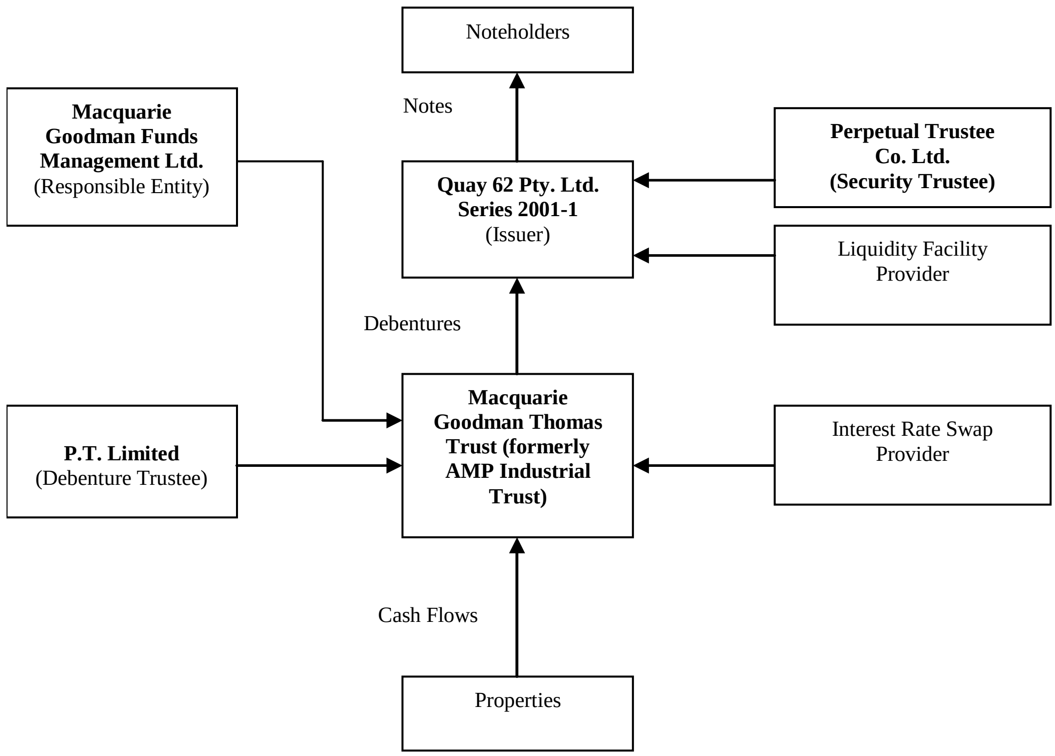
The issue was fully subscribed, with the AAA notes priced at 19 bp and BBB- notes at 85 bp over 3 month BBSW. Final maturity of the notes is June 2013.

4.6 CASE STUDY THREE: QUAY 62 PTY LTD. SERIES 2001-1

The initial Quay 62 2001-1 AU$110 million AAA-rated CMBS transaction was done by AMP Industrial Property Trust in January 2001, who were taken over by Macquarie Goodman Industrial Trust (MGI) in August 2003. MGI added twenty-six properties to the trust at a total cost of AU$614.6 million. MGI and Macquarie Goodman Funds Management (MGM) merged to form the Macquarie Goodman Group in 2004/2005, with AU$7 billion assets under management as at June 2005. Macquarie Goodman is a property investment and management group which specialises in the ownership, management and development of industrial and business space.

In December 2003, Quay 62 2001-1 issued a further AU$55 million of AAA-rated class A notes since the original issue and new subordinated Class B Notes (AU$33 million) and Class C Notes (AU$35 million). The new notes have the same scheduled and final maturity date as the existing notes. The Class B notes are fully subordinated to class A notes; the Class C notes are fully subordinated to Class A and B Notes. Figure 4.5 shows the structure of Quay 62 Pty Ltd. 2001-1 CMBS issue.

Figure 4.5: Quay 62 CMBS Series 2001-1 Transaction Structure



Source: Standard and Poor's (2003b)

Details of the issue are shown in Table 4.4. The issue shows a sector specific backed CMBS being industrial property and also the ability of CMBS issuers to issue further debt or "tap issues" once the CMBS structure has been set up.

Table 4.4: Quay 62 CMBS Series 2001-1 Issue Details

Quay 62 CMBS Series 2001-1				
Issue Date:	January 2001			
Term-to-Maturity:	5 years			
Property Type:	26 industrial properties			
Size:	526,937 m²			
Aggregate Market Value:	AU$521.5m			
Issue Size:	AU$233m			
Tranche:	AMOUNT	LTV	DSCR	BBSW
AAA	AU$165m	37.5%	2.7	37bp
AA	AU$33m	45.0%	2.3	55bp
A	AU$35m	53.0%	1.9	72bp
Interest Type:	Floating rate notes			
Occupancy Rate:	97.0%			
Weighted Average Unexpired Lease Term:	4.1years			
Liquidity Facility:	AU$13.3m or 5.7% of issued debt			
Refinance Constant::	9.5%			
Property Diversity (Largest single exposure):	AU$50.5m or 9.68% of portfolio value			
Geographic Diversity:				
New South Wales	73%			
Victoria	13%			
Queensland	7%			
South Australia	5%			
Western Australia	2%			
Herfindahl Property Type Index (HHPT):	1.000			
Herfindahl Geographic Region Index (HHGR):	0.617			

Source: Author's compilation from Standard and Poor's (2003b)

Details of the top ten properties by value in the issue are shown in Table 4.5. These had a combined market value of AU$319.90 million or 61.34% of the portfolio market value. The portfolio, though sector specific with an HHPT of 1, is well diversified in terms of property sub-class having industrial estates, business parks and warehouse distribution centres. The portfolio has an HHGR of 0.617 showing not much geographic spread. However, this is mitigated by the fact that 40% of Australia's industrial activity is located in the eastern states of NSW, Victoria and Queensland.

Table 4.5: Quay 62 CMBS Series 2001-1 Property Portfolio: Top 10 Properties by Value

Property	Location	Property Type	Size (m^2)	% of Portfolio	Market Value (AU$m)
62 Hume Highway Chullora	New South Wales	Industrial estate	45,729	9.95	51.90
3 Davis Road, Wetherill Park	New South Wales	Warehouse distribution	49,292	9.01	47.00
2-8 McPherson Street, Banksmeadow	New South Wales	Industrial estate	30,900	7.65	39.90
9 Canal Road, St Peters	New South Wales	Business park	21,815	6.71	35.00
146-156 Warren Road, Smithfield	New South Wales	Industrial estate	10,012	5.16	26.90
12-20 Anella Avenue, Castle Hill	New South Wales	Business park	23,677	5.04	26.30
2-12 Beauchamp Road, Botany	New South Wales	Industrial estate	25,013	4.95	25.80
400 Nudgee Road, Hendra	Queensland	Industrial estate	43,705	4.51	23.50
41 Roberts Road, Chullora	New South Wales	Warehouse distribution	21,905	4.28	22.30
148 James Ruse Drive, Parramatta	New South Wales	Industrial estate	14,834	4.08	21.30
Total			**286,882 m^2**	**61.34%**	**$319.90**

In line with Standard and Poor's (2003b), the following are deduced as strengths, weaknesses and mitigants of the issue:

i) Strengths:

- The collateral comprises 26 modern, investment grade buildings in the industrial and warehouses sectors, occupied by about 80 tenants generating significant annual cash flows.
- The conservative LTV afforded by the collateral at 37.5% and DSCR of 2.7x for AAA notes. Further, the notes benefit from cross collateralisation.
- The takeover of AMP Industrial Trust (AIP) by Macquarie Goodman Funds Management Ltd. (MGFM) brought management expertise and potential efficiency improvements.

ii) Weaknesses:

- The rental receipts are subject to market risk and ongoing lease maturity risk. The average lease maturity period of 4.1 years which is less than the maximum final maturity period of 5 years.

iii) Mitigants:

- Lease rollover and market risk is mitigated by the diversity of tenants and the spread in the lease rollover profile, the high debt service coverage in place, and the liquidity facility of AU$13.3 million, which is enough to cover six months of coupon and priority payments.

The issue was fully subscribed, with the AAA notes priced at 37 bp and BBB- notes at 72 bp over 3 month BBSW. Final maturity of the notes is March 2008.

4.7 CASE STUDY FOUR: ALE FINANCE COMPANY PTY LTD - SERIES 1

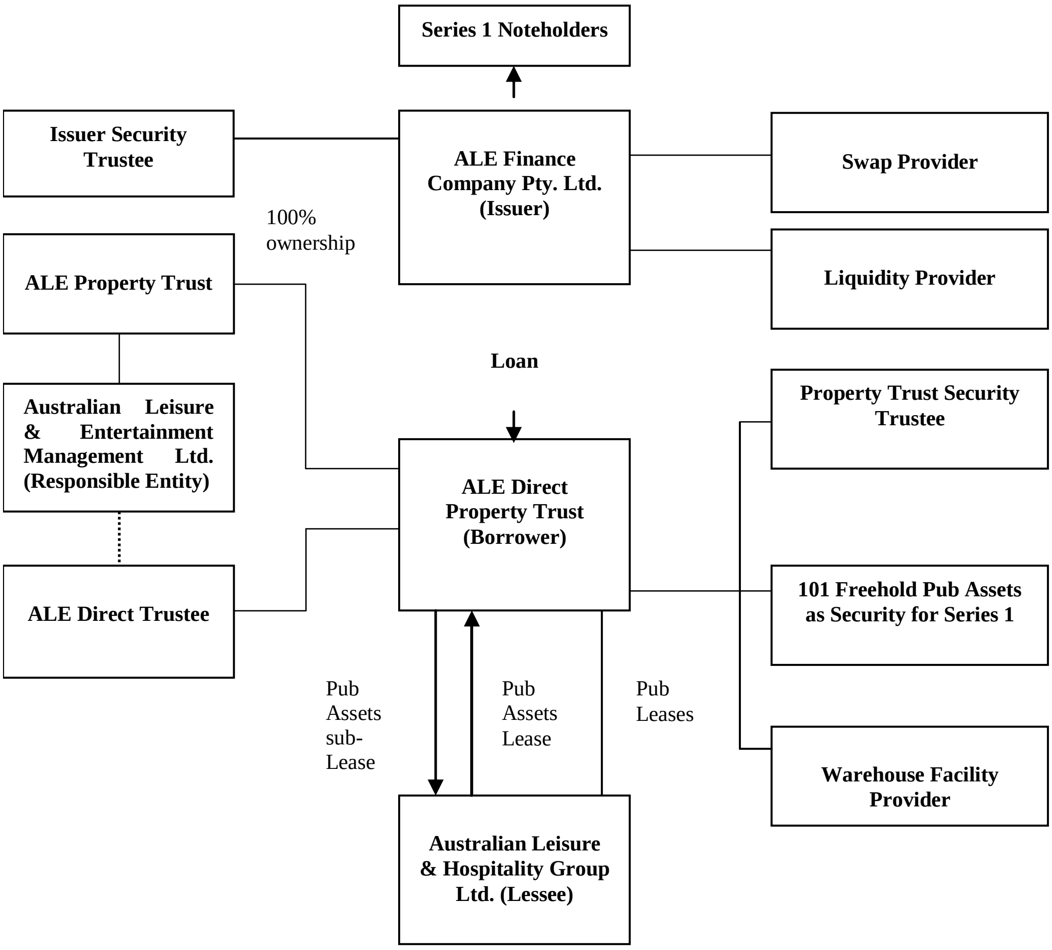
In late 2003, Foster's Group Limited divested its leisure and entertainment business, including Australia's largest portfolio of pubs, in a complex package of transactions that included the float of two separate listed businesses:

- ALE Property Trust, a holding trust that held as its principal asset all the units in a sub-trust ALE Direct Property Trust (ALE Direct), being the entity to which Foster's transferred its freehold interest in the pubs (other than a small number of pubs that Foster's itself held on lease from third parties); and
- Australian Leisure & Hospitality Group Limited (ALH), to which Foster's transferred the operating business associated with those pubs.

ALE Direct leases its pub portfolio to ALH. ALE Property Trust raised a total of AU$112 million of capital through a combination of stapled securities and unsecured loan notes, and used the issue proceeds principally to capitalise ALE Direct. ALE Direct raised a further AU$330 million through an issue of CMBSs by another member of the group, ALE Finance Company Pty Ltd. (ALE Finance), backed principally by the value of its property portfolio and of the rental stream from ALH as lessee. Through an innovative structuring arrangement with ALH, however, ALE Direct was also able to bring the enterprise value of the ALH operating business into account in support of its payment obligations under the CMBS issue, so that the transaction operated in part as a form of whole-business securitisation (WBS) by ALE of ALH’s business.

A simplified version of the transaction structure is set out in Figure 4.6. It can be seen that this structure follows closely the typical UK WBS structure. The particularly innovative aspect of this transaction lies in the relationship between ALE Direct and ALH. From a WBS perspective, it is noteable that ALE Direct is able to access the business value in ALH to support its obligation to repay its loan from ALE Finance, and so ultimately to support ALE Finance’s ability to repay its notes. Those arrangements allow ALE Direct (or its security trustee), if ALH is in default under the leases, to take possession of the pubs and sell them on behalf of both ALE Direct and ALH (Standard & Poor's 2003a).

Figure 4.6: ALE Finance Company Pty Ltd - Series 1 Transaction Structure



Source: Standard and Poor's (2003a; 2006b)

Table 4.6 shows details of the 2003 CMBS issue and subsequent "tap issue" in 2006. The tap issue raised a total of AU$350 million with class AB, B and C being nominal floating rate, bullet notes and having a final maturity date of May 2015. The class AA notes are structured as non-amortising, capital-indexed bonds, indexed to consumer price index and have a final maturity date of November 2025.

Table 4.6: ALE Finance Company Pty Ltd - Series 1 Issue Details

Details	***ALE Finance Company Pty Ltd - Series 1***				***ALE Finance Company Pty Ltd - Series 1***			
Issue Date:	November 2003				April 2006			
Term-to-Maturity:	5 years				5 years; 17 years			
Property Type:	Over 101 pubs				Over 101 pubs			
Size:	245,323 m²				245,323 m²			
Aggregate Market Value:	AU$561.9m				AU$637.7m			
Issue Size:	AU$330m				AU$350m			
Tranche:	AMOUNT	LVR	DSCR	BBSW	AMOUNT	LTV	DSCR	BBSW
AAA	AU$100m	42.6%	3.1	6.6%	AU$150m	25.4%	3.3	20bp
AAA	AU$110m	42.6%	3.1	47bp	AU$85m	39.8%	2.1	25bp
AA	AU$40m	50.7%	2.6	67bp	AU$60m	50.0%	1.7	34bp
A	AU$45m	59.9%	2.2	90bp	AU$55m	59.3%	1.4	84bp
BBB-	AU$35m	71.0%	1.8	120bp				
Interest Type:	Floating rate and fixed rate.				Floating rate			
Occupancy Rate:	100%				100%			
Weighted Average Unexpired Lease Term:	25 years				25 years			
Liquidity Facility:	AU$11m or 3.3% of issued debt				AU$12.15m or 3.5% of issued debt			
Refinance Constant:	7.0%				9.5%			
Geographic Diversity:								
New South Wales	15.3%				15.3%			
Queensland	30.7%				30.7%			
Western Australia	2.2%				2.2%			
Victoria	46.1%				46.1%			
South Australia	5.7%				5.7%			
Herfindahl Property Type Index (HHPT):	1.000				1.000			
Herfindahl Geographic Region Index (HHGR):	0.334				0.334			

Source: Author's compilation from Standard and Poor's (2003a; 2006b)

In line with Standard and Poor's (2003a; 2006b), the following are deduced as strengths, weakness and mitigants of the issue:

i) Strengths:

- The portfolio of pubs is well diversified with HHGR of 0.334, with very long leases.
- The properties generate significant annual cash flows with strong rental coverage and therefore the certainty of receiving the contracted lease payments from ALH is well supported by the operating performance of the pubs.

- The transaction benefits from a robust equity cash trap which will be triggered upon a decline of the portfolio’s earnings before interest, taxes, depreciation, and amortisation and rent (EBITDAR).
- Game-related revenues represent a significant proportion of the revenues derived by ALH as operator and lessee of the pub portfolio. These revenues are heavily regulated, and are a significant component of relevant state government derived revenue.

ii) Weakness:

- The transaction involves the securitisation of rental cash flows while the unrated tenant, AHL, is performing.

iii) Mitigants:

- The transaction structure includes triple-net leases, stringent monitoring regimes, and cash trap mechanisms to help mitigate operating performance related impacts and risks.
- In the event of failure by AHL, ALE Direct and/or ALE Finance may take control and continue to operate the pub businesses as going concern enterprises.
- A cash reserve of AU$5.5 million and a liquidity facility of AU$12.15 million is available to ALE Finance for any shortfall in loan repayments received from ALE Direct.

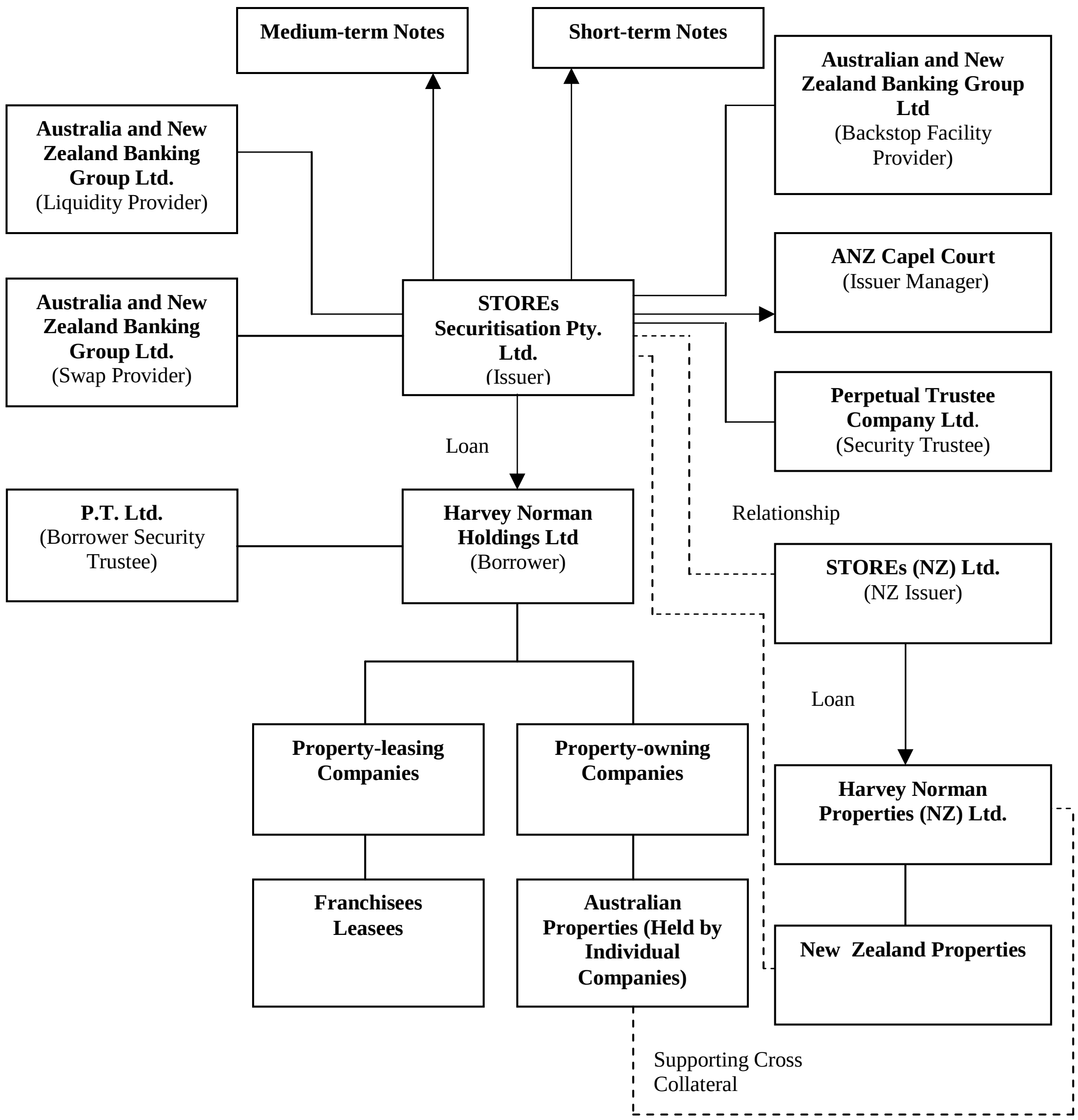
The issue was fully subscribed, with the 2003 AAA notes priced at 47 bp and the 2006 AAA notes priced at 20 bp over 3 month BBSW. Final maturity of the notes is March 2008 for the 2003 issue and May 2015 and November 2025 for the 2006 issue, respectively.

The 2006 “tap issue” was the first CMBS transaction by a property trust to issue capital index-linked debt and the first Australian CMBS transaction by a LPT to contain tranches with split maturities.

4.8 CASE STUDY FIVE: STOREs PTY. LTD.

STOREs Securitisation Pty. Ltd. (STOREs) issued in May 2004 CMBSs worth AU$220 million, which were supported by first-registered mortgages over forty-four bulky goods retail outlets in Australia trading as “Harvey Norman” or “Domayne”. Concurrently, a similar issue occurred in New Zealand, with the securities supported by ten Harvey Norman stores. The two programs were cross collateralised within each jurisdiction and across both jurisdictions. The program was designed to issue both short-term-notes and medium-term-notes. Figure 4.7 shows the transaction structure of STOREs Pty. Ltd.

Figure 4.7: STOREs Pty. Ltd. Series Transaction Structure



Source: Standard and Poor’s (2004b)

Details of the STOREs Pty. Ltd. CMBS issue are shown in Table 4.7. This is the first multi-jurisdictional CMBS issue covering Australia and New Zealand issued in Australia, with provision to issue medium and short term notes.

Table 4.7: STOREs Pty. Ltd. Issue Details

STOREs Pty. Ltd.					
Issue Date:	May 2004				
Term-to-Maturity:	5 years				
Property Type:	44 bulky good retail outlets throughout Australia and 10 in New Zealand				
Aggregate Market Value:	AU$479.6m (Australian properties)			NZ$88.7 (AU82.7m)(New Zealand properties)	
Issue Size:	AU$220m				
Tranche:	AMOUNT	LTV	DSCR	BBSW	
AAA	AU$150m	35.7%	2.7	39bp	
AA	AU$40.0m	45.2%	2.1	52bp	
A	AU$30.0m	52.4%	1.8	70bp	
Interest Type:	Floating				
Occupancy Rate:	100%				
Liquidity Facility:	AU$24m or 11.4% of issued debt				
Refinance Constant:	9.5%				
Property Diversity:	Largest two properties represent 17% of portfolio value				
Geographic Diversity:					
New South Wales	52%				
Queensland	10%				
Western Australia	10%				
ACT	7%				
Victoria	11%				
Tasmania	4%				
South Australia	6%				
Herfindahl Property Type Index (HHPT):	1.000				
Herfindahl Geographic Region Index (HHGR):	0.313				

Source: Author's compilation from Standard and Poor's (2004b)

Details of the properties backing STOREs Pty Ltd. are shown in Table 4.8. There are high levels of cash flow coverage derived from rent from franchisees and external tenants. Generally, there are between three and six franchisees within each store. The licence to the franchise is for one-month rolling term with the licence fee payable monthly in advance. Licence fees are increased by 3% and operating expenses are borne by the franchisee. Each store's administration manager handles day-to-day management of the properties. Franchisee rent is split into three elements: retail, ancillary warehouse, and administration area.

Leases to external tenants are for traditional lease terms of between three and five years with a mix of fixed and market rental reviews throughout the term. About 12% of cash flow is derived from external tenants.

Table 4.8: STOREs Pty. Ltd. Property Portfolios

State	No. of Properties	Market Value (AU$m)	Income (AU$000)	Franchisees	External Tenants
New South Wales	19	249,950	21,558	110	18
Victoria	6	47,475	4,044	31	5
Western Australia	5	54,400	5,043	33	4
South Australia	3	28,400	2,543	17	1
Queensland	7	48,200	4,298	39	4
Australia Capital Territory	2	32,350	3,160	17	1
Tasmania	2	18,850	1,828	14	1
Australia	**44**	**AU$479,625**	**AU$42,465**	**261**	**34**
New Zealand	**10**	**NZ$88,680**	**NZ$8,711**	**10**	**3**

Source: Standard and Poor's (2004b)

In line with Standard and Poor's (2004b), the following are deduced as strengths, weaknesses and mitigants of the issue:

iv) Strengths:

- The portfolio is well diversified with 44 bulky goods retail properties with a good mix of size, styles, and ages located throughout Australia. In addition, there are 10 bulky goods retail properties located in New Zealand which may support the notes issued by STOREs and STOREs (NZ). The issue has a HHGR of 0.313.
- The underlying assets tend to be in highly visible, highly trafficked areas that are well suited to retail businesses.
- Bulky goods retailing has established itself as a strong performing real estate asset class in Australia and New Zealand.
- The Harvey Norman and Domayne names are well known, established retail brands that provide a unique retail concept in Australia; and there are no directly comparable bulky goods retailers in Australia or New Zealand.

- Excess spread is trapped in the event of a borrower event of default, which may create additional reserves for debt service, property and capital expenditure, and issuer expenses.

v) Weaknesses

- The underlying franchise agreements are for monthly terms only.
- The franchisees rely heavily on the support and systems of Harvey Norman Holdings Ltd. (HNHL). If the franchisees cease to have access to these systems, there may be significant disruptions to cash flow.
- The underlying household goods retailing business is susceptible to fluctuations in general economic conditions and interest rate movements.
- The properties are generally configured to suit a larger retailer. If any of the properties have to be relet, there may be limited demand for alternative occupiers.
- The Australian and New Zealand programs are cross collateralised and, as such, a default in one jurisdiction will cause a default in the other jurisdiction.
- The two largest properties represent around 17% of the secured pool.

vi) Mitigants:

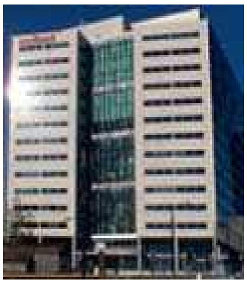
- The properties are readily capable of being sub-divided, which is useful in determining alternative use in the event of a sale after loan default.
- The conservative LTV afforded by the collateral at 31.7% to 52.4% and DSCR of 1.8x to 2.04x.
- The liquidity facility of AU$24 million is enough to cover twelve months of coupon and priority payments.

The issue was fully subscribed, with the AAA notes priced at 39 bp, AA notes at 52 bp and A- notes at 70 bp over 3 month BBSW. Final maturity of the notes is November 2010.

4.9 CASE STUDY SIX: CROMWELL CMBS PTY LTD

In April 2006, Cromwell Property Securities Limited (CPSL), as responsible entity of the Cromwell Diversified property Trust (CDPT) issued CMBSs totalling AU$452 million secured by first-ranking mortgages over fully cross-collateralised diversified pool of twenty-one properties. Some of the properties in the Cromwell CMBS Pty Ltd. property portfolio are shown in Figure 4.8. CDPT is a substantial Australian unlisted property fund with funds under management in excess of AU$1 billion and access to more than 5,600 direct investors.

Figure 4.8: Part of Cromwell CMBS Pty Ltd. Property Portfolio



700 Collins Street, Melbourne VIC

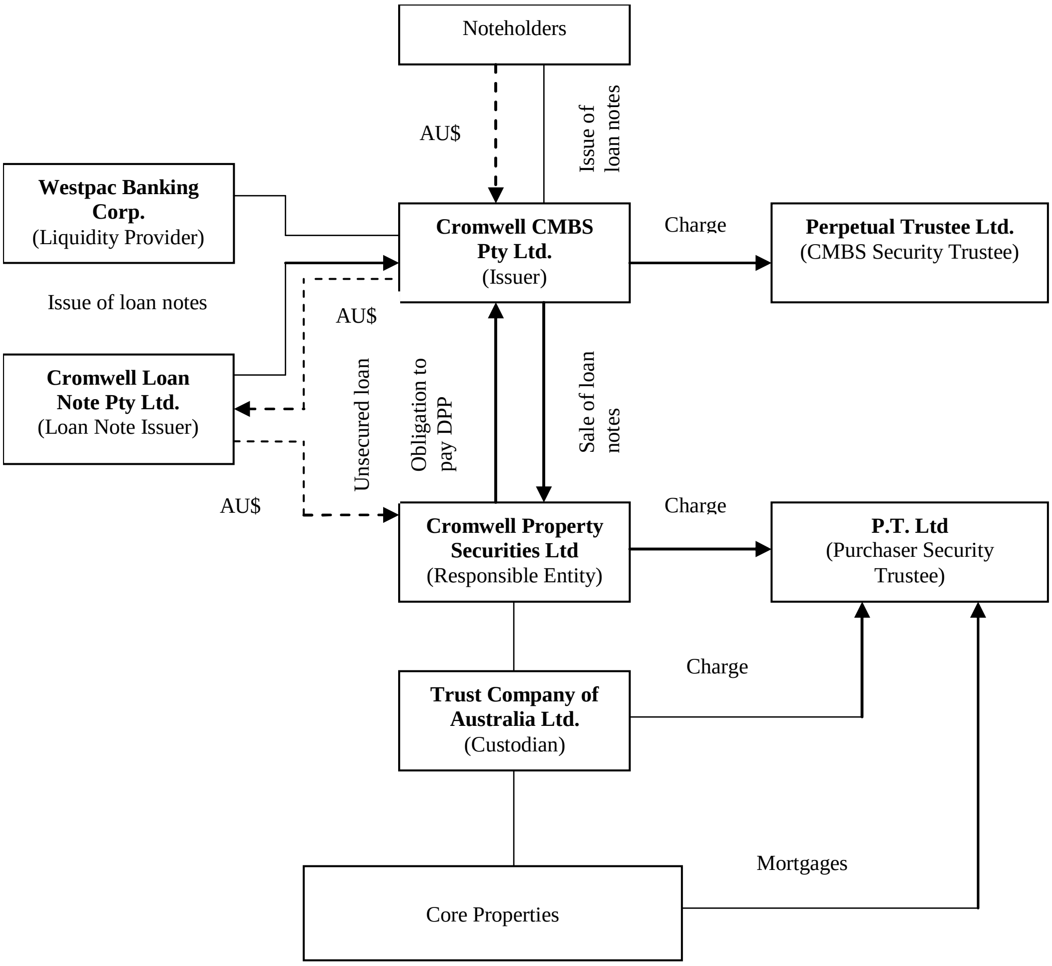
475 Victoria Avenue, Chatswood NSW

380 LaTrobe Street, Melbourne VIC

The CMBS issuance was used to re-finance existing debt, lowering CDPT's cost of funding and freeing-up credit exposure to existing bankers for easier access to funds which may be required to fund future acquisitions. The CMBS issue had a weighted average issuance margin of 25% over BBSW compared to the current equivalent weighted margin of approximately 0.95% over BBSW, which resulted in savings to the CDPT of more than AU$2 million per annum.

Figure 4.9 shows the transaction structure of the CMBS issuance. The transaction structure provides for early redemption of the class E and class F notes on a quarterly basis at the election of CPSL. It is intended that the class F notes are also able to be redrawn following a prepayment.

Figure 4.9: Cromwell CMBS Ltd. Transaction Structure



Source: Standard and Poor's (2006d)

Table 4.9 shows details of the Cromwell CMBS issue.

Table 4.9: Cromwell CMBS Pty Ltd. Details

Cromwell CMBS Pty. Ltd.			
Issue Date:	April 2006		
Term-to-Maturity:	3 years		
Property Type:	21 properties (72% commercial, 18% industrial, and 10% retail/cinema).		
Size:	396,605 m²		
Aggregate Market Value:	AU$712.98m		
Issue Size:	AU$452m		
Tranche:	AMOUNT	LTV	DSCR
AAA	AU$266.0m	40.5%	2.17
AA	AU$42.0m	47.0%	1.88
A	AU$43.0m	53.5%	1.65
BBB	AU$56.0m	62.0%	1.42
BBB-	AU$22.0m	65.3%	1.35
BB+	AU$23.0	68.9%	1.28
Interest Type:	Fixed-rate and floating-rate		
Occupancy Rate:	97.3%		
Weighted Average Unexpired Lease Term:	5.5 years		
Liquidity Facility:	AU$21.1m		
Refinance Constant:	9.25%		
Largest Tenant (% of Net Income):	9.7%		
Property Diversity (Largest single exposure):	AU$110.78m or 15.54% of portfolio value		
Net Income from Top 5 Tenants:	36.3%		
Geographic Diversity:			
Victoria	33%		
Queensland	14%		
South Australia	14%		
Tasmania	14%		
Western Australia	10%		
New South Wales	10%		
Australian Capital Territory	5%		
Herfindahl Property Type Index (HHPT):	0.561		
Herfindahl Geographic Region Index (HHGR):	0.190		

Source: Author's compilation from Standard and Poor's (2006d)

Details of the top ten properties by value in the issue are shown in Table 4.10. These had a combined market value of AU$595.89 million or 83.58% of the entire portfolio market value.

Table 4.10: Cromwell CMBS Pty Ltd. Property Portfolio: Top 10 Properties by Value

Property	Location	Size (m^2)	Occupancy (%)	% of Portfolio	Market Value (AU$m)
700 Collins St, Melbourne	Victoria	33,882	97.5	19.57	139.50
475 Victoria Ave, Chatswood	New South Wales	24,965	72.0	15.54	110.78
Australian Wheat Board Building, 380-390 Latrobe St, Melbourne	Victoria	22,041	91.7	12.72	90.70
Bundall Corporate Centre, Cnr Bundall Rd & Slayter Ave, Bundall	Queensland	13,124	99.5	6.17	44.00
Forsyth Distribution Centre, Hoopers Crossing	Victoria	52,020	100.0	5.75	41.00
Westfarmers Woolstore, Brooklyn	South Australia	104,342	100.0	5.05	36.00
Centenary House, 19 National Circuit, Barton	Victoria	6,867	100.0	4.98	35.53
100 Waymouth St, Adelaide	South Australia	12,589	100.0	4.91	35.00
Village City Centre, 200 Bourke St, Melbourne	Victoria	9,635	99.7	4.63	33.00
101 Grenfell St, Adelaide	South Australia	13,196	100.0	4.26	30.38
Total		**292,661 m^2**	**96.0%**	**83.58%**	**$595.89**

Source: Standard and Poor's (2006d)

In line with Standard and Poor's (2006d), the following are deduced as strengths, weaknesses and mitigants of the issue:

i) Strengths:

- The reasonable diversity of the collateral pool of properties supporting the CMBS. The issue has a HHPT of 0.561 and a HHGR of 0.190, with no single property contributing more than 16% of collateral pool by value.
- The secured properties have relatively lengthy weighted average unexpired lease term of 5.5 years. About 43% of current rental income is derived from government related authorities, with a further 21% derived from investment grade tenants.
- The majority of the collateral properties are modern and well maintained, minimising the likelihood of significant capital expenditure during the transaction term.

ii) Weaknesses

- The three largest assets account for 47.8% of the collateral pool, by value.
- The collateral includes 16 properties subject to single tenancies or with a significant exposure to a single tenant, representing 41% of the pool.
- The collateral includes five cinema properties representing 10% of the portfolio value, whose values are considered to be more volatile than established commercial and industrial properties.

iii) Mitigants:

- The two of the three largest properties are newly refurbished and the third property is newly constructed. The properties are leased to investment grade tenants and their weighted average unexpired lease term is 9.6 years.
- No single tenant contributes more than 10% of the portfolio's gross income.
- The liquidity facility of AU$21.1 million is enough to cover six months of coupon and priority payments.
- A rental reserve of AU$2 million for the benefit of noteholders to cover for any disruptions in rental payments from the cinema properties.

The issue was fully subscribed, with final maturity of the notes being October 2010.

CDPT were the first unlisted property trust to enter the CMBS market, with other unlisted trusts expected to emulate them in diversifying their sources of funds.

4.10 CROSS CASE STUDY ANALYSIS

The property class backing a CMBS issue will influence its transaction structure. Of particular importance are its fundamental property characteristics, which in turn influence the issuer's risk profile. Cross case study analysis of the CMBS issues mainly involves property risk assessment. Presented here is a comparison of the transaction structures and issue details, with details on property risk assessment presented in chapter five.

The case studies reviewed show the diversity of issuance transaction types depicting the maturity of the market as well as the issuer's confidence in trying out various CMBS structures to suit market needs. Centro Shopping Centre Securities - CMBS Series 2006-1 or "Centro" and ALE Finance Company Pty. Ltd. – Series 1 were the first conduit and whole-business CMBS transactions, respectively, in Australia. Centro further had a tranche which was denominated in Euro's targeted forwards European investors. The international approach in structuring CMBSs can also be seen in STOREs Pty. Ltd. The CMBS issue had multi-jurisdiction covering Australia and New Zealand. Entrance into the CMBS market has also been made by unlisted property trusts, as shown by the Cromwell CMBS Pty Ltd. CMBS issue. Some unlisted property trusts have become sophisticated and have outgrown their existing financing mechanisms and CMBSs are an alternative debt funding tool for them. This will add to further growth of the CMBS market. The ability of existing CMBSs to issue further debt or "tap issues" can be seen in the ALE Finance Co. Pty Ltd. – Series 1 and Quay 62 Pty Ltd. Series 2001-1 issues. In 2006, over 80% of activity came from tap issues, refinancing and restructurings from existing sponsors (Efrat 2006).

Another feature in the Australian CMBS market has been the increase in the size of issues. For instance, all the new issues in 2006 each had a combined tranche value of over AU$400 million. Furthermore, the last two years have seen record issue sizes with AU$1 billion for Multiplex MPT CMBS Series 2005-1 & 2 in 2005 and AU$900 million for Centro Shopping Centre Securities - CMBS Series 2006-1 in 2006. This is a significant shift from the early 2000's CMBS issues which had combined totals of less than AU$400 million.

4.11 SUMMARY

The chapter highlighted how the Australian CMBS market has evolved from the simplistic CPIT Aurora 2006 Bonds CMBS issue to the more complex Centro Shopping Centre Securities Limited – CMBS Series 2006-1 CMBS issue. Investor appeal has been broadened by issuing sector specific property-backed CMBSs and diversified property-backed CMBSs. Sector specific property-backed CMBSs are further diversified by property sub-class. Other investor appeal features include multi-jurisdiction CMBS issues and foreign currency denominated tranches in some CMBS issues.

The case studies further show two features which a particular to Australian CMBSs different from other parts of the world relating to the secured loan structure and issuance of soft bullet securities. Conduit transaction structures common in the US have just been introduced though backed by direct property assets.

The next chapter looks at the assessment of property risk in Australian CMBSs. Adequate assessment of property risk and its reporting is critical to the success of CMBS issues.

CHAPTER 5

ASSESSMENT OF PROPERTY RISK IN AUSTRALIAN COMMERCIAL MORTGAGE-BACKED SECURITIES

5.1 BACKGROUND

The previous chapter showed case studies depicting the growth of Australian CMBSs and the diversity of the CMBS issues. This chapter will highlight the significance of credit risk assessment in Australian CMBSs.

According to Henderson and ING Barings (1997), assets backing a securitisation are its fundamental credit strength. In the case of Australian CMBSs this involves looking at the property backing these issues vis-à-vis property risk. There are four main areas of risk in securitisation, namely asset risk; cash flow risk; legal risk; and third party risk. Moody’s Investor Service (2003) state that the credit risk of a mortgage loan will depend on the characteristics of the underlying properties; the loan structure; loan-to-value (LTV) and debt service coverage ratio (DSCR); the overall portfolio diversification; and other factors, such as the transaction structure, legal risk and servicing quality. Moody’s further state that the assigned rating is the relative risk of the collateral and its ability to generate income. Therefore, the ratings inform the public of the likelihood of an investor receiving the promised principal and interest payments associated with the bond issue (Shin & Han 2001).

In particular, a framework is proposed under which property risk assessment, as delineated by Adair and Hutchinson’s (2005), can be reported in a more concise and systematic approach. A case study is presented to illustrate assessment and reporting of property risk within and among CMBS issues.

The key headings under Adair and Hutchinson’s (2005) property risk scoring model are:

- Market transparency risk;
- Investment quality risk;
- Covenant strength risk; and

- Depreciation and obsolescence risk.

However, of concern are the last three property risk parameters since market transparency risk is not an issue for the Australian property market. Australia is one of the most transparent property markets, ranked first together with the USA (Jones Lang LaSalle 2006b) and has the most highly securitised commercial property market in the world (Hughes & Arissen 2005). Jones Lang LaSalle(JLL) (2006:3) define transparency as "as any open and clearly organized real estate market operating in a legal and regulatory framework that is characterized by a consistent approach to the enforcement of rules and regulations and that respects private property rights. JLL further add that "the ethical and professional standards of private sector advisors, agents and brokers who are licensed to conduct business in each country have to be high". The advantage of having a highly securitised property market is that investors have more publicly available information on property risk as a result of the listed property companies being legally bound to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity investors. According to Hughes and Arissen (2005), 30.2% of Australia's investment-grade property was listed on the stock market and the share of listed property as a percentage of overall stock market was 10.7%, higher than any other country in the world.

Other secondary risk factors such as legal risk and third party risk are not addressed as common structural mechanisms to mitigate them have been set for all CMBS issues; readers referred to Standard and Poor's, (2005c), Clayton UTZ (2003) and Moody's Investor Service (2003). The proposed property risk assessing and reporting framework should prove useful to rating agencies, bond issuers and institutional investors. Rating agencies could adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors could examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

5.2 SIGNIFICANCE OF PROPERTY RISK ASSESSMENT

The last few years have seen growth in the area of property risk research in both the valuation and investment realm. The debate for more property risk research started with the Mallinson Report (RICS 1994). One of the recommendations of this report was that common professional standards and methods should be developed for measuring and expressing valuation uncertainty. Mallinson and French (2000) took this recommendation a step further by examining in-depth the reporting of uncertainty within valuation to the client. They proposed a statistical method to account for uncertainty in valuation reports. The Investment Property Forum/Investment Property Databank (2000; 2002) also highlighted the need for more rigorous risk assessment measures within the property profession, with a conclusion that a new approach was needed which combined conventional analysis of returns uncertainty with a more comprehensive survey of business risks. This debate was brought into sharper focus by the publication of the Carsberg Report (RICS 2002) , which emphasised the need for more acceptable methods of expressing uncertainty, particularly when pricing in thin markets where information is deficient. Furthermore, the debate on the reporting of risk was taken forward by The European Group of Valuers Association (TEGoVA) (2003) by the publication of the "European Property and Market Rating: A Valuer's Guide". The function of the rating system is to support risk, property, and loan analyses of portfolios in connection with securitisation, investment and disinvestment decisions and granting of property loans respectively. An earlier publication by TEGoVA (2002) entitled "European Mortgage Securitisation: A Valuer's Guide" provided valuers with criteria for determination of the risk profile in the European mortgage-backed securities market. The International Valuation Standards Committee (IVSC) (2006c) has also published a white paper on guidelines for the valuation of property-backed securitised assets, with a call for comments on these guidelines. The thrust of the white paper is that these assets should be assessed on a discounted cash flow basis accounting for all risk factors.

Lorenz et al (2006) show how rating and simulation approaches can be used in property valuation to address uncertainty and risk. Hutchinson et al (2005) develop a generic market model that can be used to risk score individual property investments utilising the Analytic Hierarchy Process (AHP), a multi-criteria decision making tool. Adair and Hutchinson (2005) examine risk analysis within investment decision-making framework and the property industry and further explain how their property risk scoring framework can be applied. French and Gabrielli (2004; 2005) show the superiority of using simulations in property valuation to account for uncertainty. Despite attempts by these studies for better assessment of risk and uncertainty and their communication to clients, Lorenz (2006) and Joslin (2005) concede that the concept of uncertainty within property valuation is poorly understood and that it is rarely conveyed to clients in a coherent form.

Impetus for the explicit communication of risk in property has emerged more recently under the requirements of the Basel 2. The implications of Basel 2 are that banks must be more explicit about the risks of lending. As property constitutes a major source of such lending, the identification, analysis and communication of the risks involved are becoming more important (APRA 2007b; The Economist 2005)

Lorenz et al (2006) report that confusion surrounds the terms risk and uncertainty within valuation literature because they are often used interchangeably and because one can often be found within the description of the other. They do not offer a definition of risk but follow Chicken and Posner's (1999) classification of the constituents of risk as shown below:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Whereby hazard is the way in which a thing or situation can cause harm while exposure is the extent to which the likely receipt of the harm can be influenced by the hazard. This is analogous to the perception of risk in CMBS in terms of the probability of default and severity of loss. The probability of default is measured through debt service coverage ratio (DSCR) and severity of loss through loan-to-value (LTV) ratio. Fabozzi and Jacob (1997) state that these are the main criteria used to quickly assess the risk of CMBS deals. The LTV is calculated by dividing the total amount of the notes issued by the current market value of all the properties. The DSCR is calculated by dividing the total net passing income of the properties by the debt-servicing amount. The debt-servicing amount is derived by multiplying credit rating agencies' stressed interest rate assumption by the notes' issuance amount.

Credit rating agencies establish a stabilised net cash flow and a ‘assessed capital value’, which are used as the basis of the debt-sizing calculations. The appropriate LTV and DSCR are applied to those values. The capitalisation rate used to determine the ‘assessed capital value’ is a function of the risk and return of the asset, reflecting its age, quality, location, and competitive position within the market.

Moody’s Investor Service (2003) state that the core of their analysis is the assessment of cash flows that will be available to service the debt during the term of the loans and for refinancing, if necessary. Sustainable cash flows are meant to represent the cash-generating potential of a property looking through the real estate cycle. Underwriting at or near the peak is more likely to produce unsustainable incomes and capital values than underwriting at the bottom of the cycle. For instance, Fitch Ratings (1999) show that a rating of ‘A’ or higher should have survived the early 1990’s Australian recession intact. Transactions rated lower than ‘A’ would have suffered losses. At the peak of the recession in 1992, interest rates rose to 17% and commercial real estate market in Sydney, Melbourne, Perth and Adelaide were severely hit. In general, net effective rents on commercial properties decreased more than 50%, vacancy rates increased to more than 20%, and values dropped more than 50%.

One of this study’s major contributions is offering a framework for assessing and communicating property risk for the success of the CMBS issues. As pointed out earlier, risk and uncertainty are poorly understood in property valuation and this may extend to CMBSs since property assets are the fundamental credit strength of Australian CMBSs. CMBS investors are able to make informed decisions before investing in CMBSs on the premise that property risk has been systematically and consistently assessed before credit ratings are assigned prior to the launch of the CMBS issue.

5.3 METHODOLOGY AND DATA

All the CMBSs issued over a six year period of 2000 to 2005 were obtained from Standard and Poor's presale reports as found in their Ratings Direct database to identify and review how property risk factors were addressed in all issues and within specific property asset classes following the delineation of property risk by Adair and Hutchinson (2005).

The dataset comprised a total of 49 generic CMBSs (excluding credit lease and small ticket transactions) with a total of 135 tranches, worth over AU$10.3 billion. Generic CMBSs, which are mainly single-borrower transactions, account for 62% of all CMBS issuances (Standard & Poor's 2005a). Credit lease and small ticket transactions are not discussed in this thesis. Specific details obtained per CMBS issue were:

- Total lettable area, capital values, and net income;
- Gearing and transaction structure details;
- Tenancy and lease details relating to the credit quality of tenants, tenant concentration, and lease expiry profiles;
- Asset quality details relating to location, average age, condition, and tenancy retention;
- Diversification and total number of assets backing the issues; and
- Management profile of issuers.

Table 5.1 presents a summary of aggregated details of all the Australian CMBSs issued from 2000 to 2005.

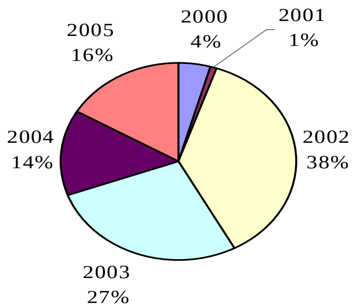
Table 5.1: Summary of Australian CMBS (2000 - 2005)

Sector	Issue	Issued Amount (A$m)	Note Tenure (Years)	Property Details							Financial Details			Tenant/Lease Details				No. of Assets		
				TLA (m^2)	Capital Value			Net Income ($m)			Gearing		LF	CQI	TC	WALE	OR	TA	Diversity	
					MV (AU$m)	S&P AV (AU$m)	CVD (%)	NI (AU$m)	S&P NI (AU$m)	NID (%)	DSCR	LTV							PD	HHGR
All	Min	0.44	1	49,650	200	200	0.0%	17.90	17.90	0.0%	1.20	32.0%	1.16%	0.0%	20%	3.6	83.0%	1	8.0%	0.20
	Max	350	7	1,008,603	1,880	1,660	22.9%	142.20	120.30	22.5%	3.50	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	100.0%	1.00
	Average	75	4	349,805	760	672	11.0%	62.00	56.28	9.0%	2.14	45.1%	3.1%	37.5%	45.8%	7.8	97.2%	21	29.8%	0.47
Diversified	Min	1	3	97,316	265	228	7.3%	21.00	19.50	3.0%	1.29	32.0%	1.9%	17.9%	42.0%	3.6	91.3%	7	9.7%	0.32
	Max	350	6	588,200	1,430	1,255	20.2%	123.87	107.80	13.4%	3.50	68.0%	4.4%	56.0%	67.0%	10.0	99.0%	25	60.2%	0.51
	Average	62	4	284,666	688	606	12.0%	56.79	50.97	9.3%	2.10	46.1%	3.2%	39.5%	50.9%	7.1	97.0%	19	35.5%	0.40
Industrial	Min	5	1	500,844	454	399	3.0%	46.00	37.80	2.0%	1.46	33.0%	2.0%	24.2%	24.3%	4.1	94.0%	26	8.0%	0.48
	Max	185	5	1,008,603	1,147	885	22.9%	92.26	84.10	17.8%	3.10	68.0%	3.3%	24.2%	25.0%	6.3	99.0%	39	14.0%	0.79
	Average	60	3	787,841	808	701	12.2%	74.79	67.53	9.8%	2.40	42.6%	2.5%	24.2%	24.9%	5.4	97.6%	34	10.2%	0.63
Office	Min	10	1	49,650	495	473	4.4%	34.40	29.30	5.4%	1.28	32.0%	1.2%	13.3%	39.0%	4.1	83.0%	1	11.9%	0.26
	Max	350	5	431,691	1,880	1,660	16.4%	142.20	120.30	22.5%	2.40	62.0%	3.4%	75.0%	79.9%	8.0	99.5%	21	100.0%	1.00
	Average	133	3	310,142	1,220	1,084	10.9%	96.40	83.27	13.6%	2.04	41.0%	2.2%	44.3%	54.2%	5.7	96.4%	13	26.3%	0.49
Retail	Min	0.44	3	91,152	200	200	0.0%	17.90	17.90	0.0%	1.20	35.0%	2.0%	0.0%	20.1%	4.0	93.0%	2	11.0%	0.20
	Max	240	7	533,343	1,380	1,100	20.3%	92.80	85.40	13.9%	3.30	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	64.0%	0.78
	Average	61	5	189,845	524	468	9.7%	41.76	39.06	5.9%	2.09	47.9%	3.9%	30.5%	45.0%	13.9	97.8%	20	37.0%	0.45

Key:
TLA: Total Lettable Area
MV: Market Value
S&P AV: Standard & Poor's Assessed Value
CVD: Capital Value Discount
NI: Net Income
S&P NI: Standard & Poor's Net Income
NID: Net Income Discount
DSCR: Debt Service Coverage Ratio
LTV: Loan-to-Value Ratio
LF: Liquidity Facility (% of S&P AV)
CQI: Credit Quality of Income (% of income from investment grade tenants)
TC: Tenancy Concentration (Top 5 tenants as % of total gross income)
WALE: Weighted Average Unexpired Lease Term (Years)
OR: Occupancy Rate (%)
TA: Total number of properties
PD: Property Diversity (% of portfolio value)
HHGR: Geographic Diversity Herfindahl Index

Over the study period, the peak issuance year was the year 2002 with 19 (38%) followed by the year 2003 at 14 (27%) issues. The years 2004 and 2005 had comparatively similar issuances at 7 (14%) and 8 (16%) respectively. The formative years of 2000 and 2001 had issues of 2 (1%) and 5 (4%) respectively. These figures are represented in Figure 5.1.

Figure 5.1: Australian CMBS Issuance by Percentage (2000 - 2005)

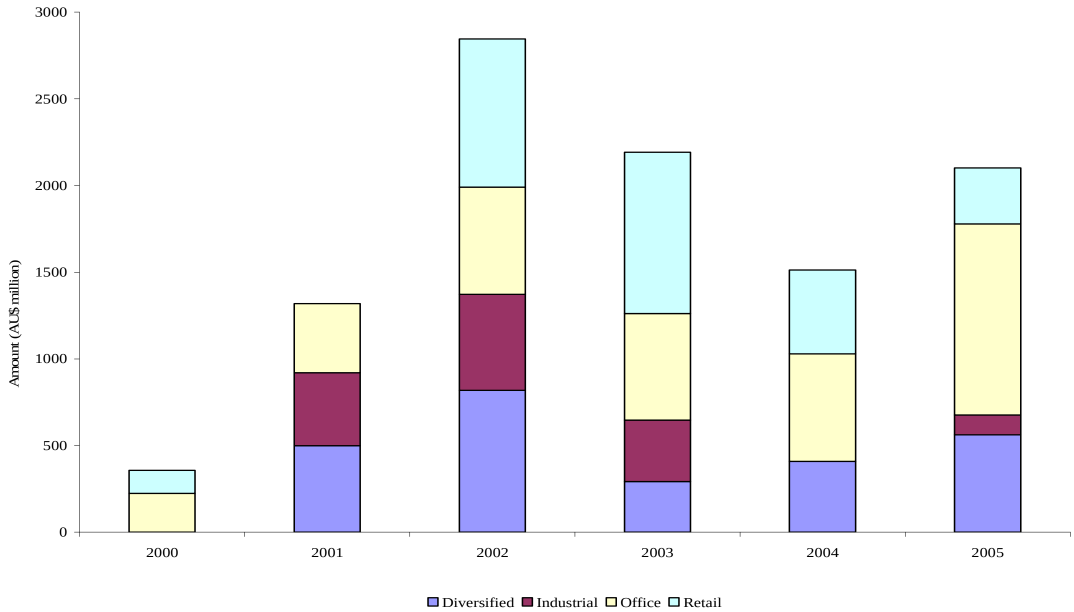


Source: Author's compilation from various Standard and Poor's CMBS presale reports

Figure 5.2 presents the CMBS issuance by sector over 2000 to 2005. Over this six year period, the most dominant CMBS issues have been in the office sector (AU$3.6 billion), followed by the retail sector (AU$2.7 billion). The diversified sector[17] and the industrial sector have had AU$2.6 billion and AU$1.4 billion worth of CMBS issuance respectively.

[17] These are property portfolios composed of different property types.

Figure 5.2: Australian CMBS Issuance by Sector Amounts (2000 - 2005)



Source: Author's compilation from various Standard and Poor's CMBS presale reports

To illustrate property risk assessment in individual CMBS issues, *Multiplex CMBS Issuer Ltd. Series 2005-1 & 2005-2* are taken as case-study. The Multiplex CMBS issues were selected on account of being the largest and most recent during our study period.

5.4 RESULTS AND DISCUSSION

The CMBS data collected as pointed out in Section 5.3 were analysed on an aggregate basis to compare property risk assessment within the various property sub-classes using the proposed framework. The results of the analysis under the delineation of property risk are shown below.

5.4.1 Investment Quality Risk

5.4.1.1 Cross and Over-Collateralisation

Cross-collateralisation is a standard feature in Australian CMBS issues. Equity and cash flows from performing properties are available to support weaker properties, reducing the probability of default and improving the recovery assumptions on the loan. Large asset backing contributes to the attainment of a higher credit rating (Moody's Investor Service 2003). Lee (2007), among other authors, asserts that real estate portfolios with smaller number of properties have a higher volatility of portfolio returns than larger portfolios. CMBSs backed by industrial property had the most number of properties per issue at an average of 34 properties (788,000m^2), followed by retail property-backed issues at an average of 20 properties (190,000m^2). These were followed by CMBSs backed by diversified properties at an average of 18 properties (285,000m^2) per issue. The least number of properties backing a CMBS issue were those of office properties at an average of 13 properties (310,000m^2) per issue.

Over-collateralisation is achieved by the special purpose vehicle owning assets to a greater value than the funds it raises from investors or lenders (Henderson & ING Barings 1997). In case of default, the market value should be able to meet all loan repayments. However, credit rating agencies substantially discount market values and net income to arrive at their "assessed values". Assessed values are the basis on which loan-to-value ratio (LTV) and debt-to-service coverage ratio (DSCR) are determined. These are the main criteria used to quickly assess credit risk of CMBS deals (Fabozzi & Jacob 1997). This offers 'double-edged' protection to investors as the adopted LTV and DSCR are conservative in comparison to those used in direct property lending and are further based on discounted values.

Table 5.1 shows averages of market value, Standard and Poor's (S & P) assessed values, capital value discount, net income, S & P net income, and net rent discount, among others, over the study period. Industrial property-backed issues showed the highest average capital value discount (12.2%) followed by diversified property-backed issues (12.0%), office backed issues (10.9%) and retail property-backed issues (10.0%). Further, average net income discount shows office backed issues had the highest discount (13.6%) followed by industrial property-backed issues (9.8%), diversified property-backed issues (9.3%); and retail property-backed issues (5.9%) had the lowest discount. These discounts can be used as proxies of portfolio composition and CMBSs that can be issued. For instance, a CMBS issue of AU$100 million needs to be backed by a portfolio value of AU$109 million at a market average discount of 10.9% in the case of office backed issues.

These results show that the composition of a property portfolio backing an issue and the capital and rental discounts applied, considered the volatility of the returns of the various property sub-classes. Moody's Investor Service (2003) assert that the stability of the cash flows and asset values of the major property types, ranked in order from lowest to highest volatility, is as follows – retail, industrial, office and hotel.

5.4.1.2 Occupancy Rates

Occupancy rates in all issues ranged between 83% and 100% above industry averages. Retail property-backed issues had an average occupancy rate of 98% in line with the average national occupancy rates of 97% - 98% followed by diversified and industrial property-backed issues which had 97% each. Office property-backed issues had an average occupancy rate of 96%, significantly above the average national occupancy rate of 92.5% as at December 2005 (Colonial First Estate Global Asset Management 2006). High occupancy rates mitigate the risk of rental loss due to vacancies.

5.4.1.3 Loan-to-Value (LTV) Ratio and Debt Service Coverage Ratio (DSCR)

As pointed out in Section 5.2, the risk and return profile of an asset reflects its age, quality, location, and competitive position within the market. These aspects are captured in the capitalisation rate adopted for property valuation. The 'assessed capital value' is the basis of the debt-sizing calculations of LTV and DSCR.

The incidence of default rises as the LTV rises; that is, if all other factors are held constant, the probability of default for a loan increases as the LTV increases, but not equally. Unlike the LTV, where the probability of default increases as the LTV rises, the incidence of default is a decreasing function of the DSCR. However, the relationship between the DSCR and the probability of default is weaker than the relationship between the LTV and default (Fabozzi & Jacob 1997). Table 5.2 shows composite ranges for both DSCR and LTV across all rating classes assigned during the study period. It should be noted that various rating classes have specific LTV and DSCR ranges. Progression from the lower notes (BBB) to higher notes (AAA), LTV thresholds decrease and DSCR thresholds increase respectively. Details of indicative LTV and DSCR threshold levels in various asset classes can be found in Standard and Poor's (2003c) and Jones Lang LaSalle (2001).

Table 5.2: LTV and DSCR Threshold in Australian CMBS Issues (2000 - 2005)

Sector	DSCR (x)		LTV range (%)*	
	Min	**Max**	**Min**	**Max**
Diversified	1.29	3.50	0.32	0.68
Industrial	1.46	3.10	0.33	0.68
Office	1.28	2.40	0.32	0.62
Retail	1.20	3.30	0.35	0.76

Source: Author's compilation from Standard and Poor's CMBS presale reports

DSCR ranged from 1.46 to 3.10 for the industrial and 1.28 to 2.40 for office property-backed issues. Retail and diversified property-backed issues had a slightly higher ranges of 1.2 to 3.3 and 1.29 to 3.50, respectively. As for LTV ratios, the highest range was again in the retail property-backed issues from 0.35 to 0.76 with those backed by the diversified, industrial and office property-backed issues ranging from 0.32 to 0.628 as shown in Table 5.2. This confirms the earlier Moody's Investor Service (2003) and Jones Lang LaSalle (2001) suppositions of retail properties having the least cash flow and asset value volatility and hence rating agencies assessing them at higher LTV and DSCR ranges.

5.4.1.4 Liquidity Facility

This covers interest shortfalls and amounts necessary to preserve and protect the mortgage collateral. The standard has been to allow for six months of note payments at the credit rating agencies refinance constant for six months of transaction expenses. Across all issues this ranged from 1.16% to 13.3% of S & P's accessed capital values. Diversified property-backed issues had a range of 1.9% - 4.38%; industrial property-backed issues ranged from 1.96% - 3.34%; and office property-backed issues from 1.16% - 3.4%. The largest range was in the retail property-backed issues which had 2.0% - 13.3%. A probable explanation is the number of tenants in property portfolios to mitigate incidences of rental default. For instance, retail properties have a larger number of tenants, hence the higher liquidity facility demanded.

5.4.1.5 Overall Portfolio Diversity

The diversity of a portfolio of assets will have an impact on the volatility of the pool's expected loss. Diversity is examined by property type, geographic location, property concentration and economic sector. By diversifying the mix of property types, one can mitigate a pool's expected loss. Geographic diversity mitigates the risk of single market decline and may reduce any losses associated with this type of risk. Generally, loans secured by operational real estate such as hotel properties tend to have the highest default probability followed by unanchored retail properties and office properties. Loans secured by anchored retail and industrial/warehouse properties have the lowest default levels (Jones Lang LaSalle 2001). Roche (2002) further expands this assertion by stating that diversity across property type is more valuable than geographic diversity because the market for investment grade in Australia is relatively small and values across cities for specific asset types, such as single tenanted, large office properties in secondary CBD or suburban locations, are highly correlated. Table 5.3 shows the composition of Australian CMBS property portfolios by property class.

Table 5.3: Composition of Australian CMBS Property Portfolios by Property Class

Property Type	Property Portfolios			
	Diversified	Industrial	Office	Retail
Hotel	√			
Cinema	√			√
Car park	√			
Warehouse/Distribution	√	√		
Business/Office park	√	√		
Industrial estate	√	√		
Container park	√			
Campus	√			
Development site/Hi-tech	√	√		
CBD A-grade offices	√		√	
Non-CBD A-grade offices	√		√	
Regional shopping centre				√
Sub-regional shopping centre				√
Neighbourhood shopping centre				√
Bulky goods retail centre				√

Following Hedander (2005) who used a diversity scoring system based on the Herfindahl Index to measure diversity on a geographic and property type mix in Australian listed property trusts, a similar procedure is adopted to measure diversity in Australian CMBS portfolios. This index effectively converts a pool of CMBS issues of uneven size into a measurement of diversity, as if all issues were the same size. A totally focussed CMBS issue has an index equal to one, while the index for a diversified CMBS issue is closer to zero.

The Herfindahl geographic region index (HHGR) for each respective CMBS issue is calculated as follows:

$$\text{HHGR} = \sum_{j=1}^{8} \left(\frac{x_j}{x}\right)^2 \tag{5.1}$$

where:

j = Geographic region: the states in Australia (New South Wales, Victoria, Queensland, South Australia, Western Australia, Northern Territory, Australian Capital Territory (ACT) and Tasmania,

x_j = percentage of asset type in portfolio

x = total portfolio composition

Of all the CMBS sector issues, diversified property-backed issues had the most geographical diversity with an average score of 0.40 followed by retail and office property-backed issues with scores of 0.45 and 0.49, respectively. Industrial property-backed issues had the least diversity with a score of 0.63. An explanation of this is that the eastern states of New South Wales and Victoria account for the bulk of Australia's gross domestic product. Retail and office properties included in most issues are found in most states with little representation in Tasmania and Northern Territory.

The Herfindahl property type index (HHPT) for each respective CMBS issue is calculated as follows:

$$\text{HHPT} = \sum_{i=1}^{6} \left(\frac{x_i}{x}\right)^2 \qquad (5.2)$$

where: i = type of property: industrial, office, retail, hotel, car park, other

x_i = percentage of asset type in portfolio

x = total portfolio composition

Assessment for diversity by property type basis was only undertaken for the diversified property-backed sector, which had a score of 0.77. Lack of adequate data was the reason for not assessing the retail, office and industrial sectors.

Another measure of diversity is the percentage of the largest property by value in relation to the whole portfolio value (PD). A large single property value exposure has a negative impact on the portfolio in instances of default. The retail property-backed sector had the largest average single property value concentration at 37.5% due to the large size of the properties both on floor area basis and by market value. The least was the industrial sector at 10.2%. The diversified property-backed sector closely followed the retail property-backed sector at 35.5% whereas the office property-backed sector had an average of 26.3%.

Details on HHGR and PD are found in Table 5.1.

5.4.2 Covenant Strength Risk

Covenant strength risk is impacted through credit quality of income, the weighted average lease expiry profile, and tenancy concentration. A large percentage of income from investment grade tenants minimises the incidence of default whereas a lower diversity of tenants increases the incidence of default.

Tenancy concentration is measured through the contribution of 5 top tenants' contribution to total net income. The office sector had the highest percentage of the 5 top tenants' contribution to net income at an average of 54.2% and the least was the industrial sector at 24.9%. The diversified and retail sectors had averages of 50.9% and 45.0%, respectively.

As for credit quality of income which is measured by percentage of income from investment grade tenants, the same trend exhibited in tenancy concentration continues with office sector at 44.3%, diversified sector at 39.5%; retail sector at 30.5%; and industrial sector at 24.2%. An explanation of this is that most office buildings included in CMBSs are prized-trophy properties occupied by large, well-established and often highly credit-rated firms. As for retail properties, apart from credit-rated anchor tenants such as the Woolworths group, Coles Mayer and David Jones, the bulk of the tenants are small unrated specialty shops.

A higher WALE profile also lowers the incidence of default as there is a higher probability of rental receipt (Moody's Investor Service 2003). All the issues had WALE profiles above the tenure of the issued CMBS notes. Retail sector had an average WALE of 13.9 years due to long leases by some anchor tenants in excess of 15 years. The diversified sector had average WALE profile of 7.0 years and the office and industrial sectors had 5.6 and 5.4 years, respectively. The WALE profile is important in the determination of the note tenure. For instance, the note tenure of CMBSs backed by retail properties are longer than those backed by other property classes at an average of 2 years due to the long leases found in this property class.

5.4.3 Depreciation and Obsolescence Risk

In all the issues, depreciation and obsolescence risk is mitigated by the inclusion of maintenance and capital expenditure reserves. Sufficient and regular capital expenditure is necessary to ensure that collateral quality, occupancy and value are maintained. A capital expenditure reserve may be required to ensure sufficient funds are available to cover any major capital expenditure works during the life of the transaction. Capital expenditure requirements may also be addressed via a guarantee facility from an appropriately rated counterparty. There are no set rules as each transaction has different requirements depending upon the condition of the assets, the gearing levels, and the positioning of the asset in the market. Some of the parameters in place are lump sums over a certain period or percentages of the independent valuation of the "core" properties.

5.5 CASE STUDY: MULTIPLEX CMBS ISSUER LTD. SERIES 2005-1 & 2

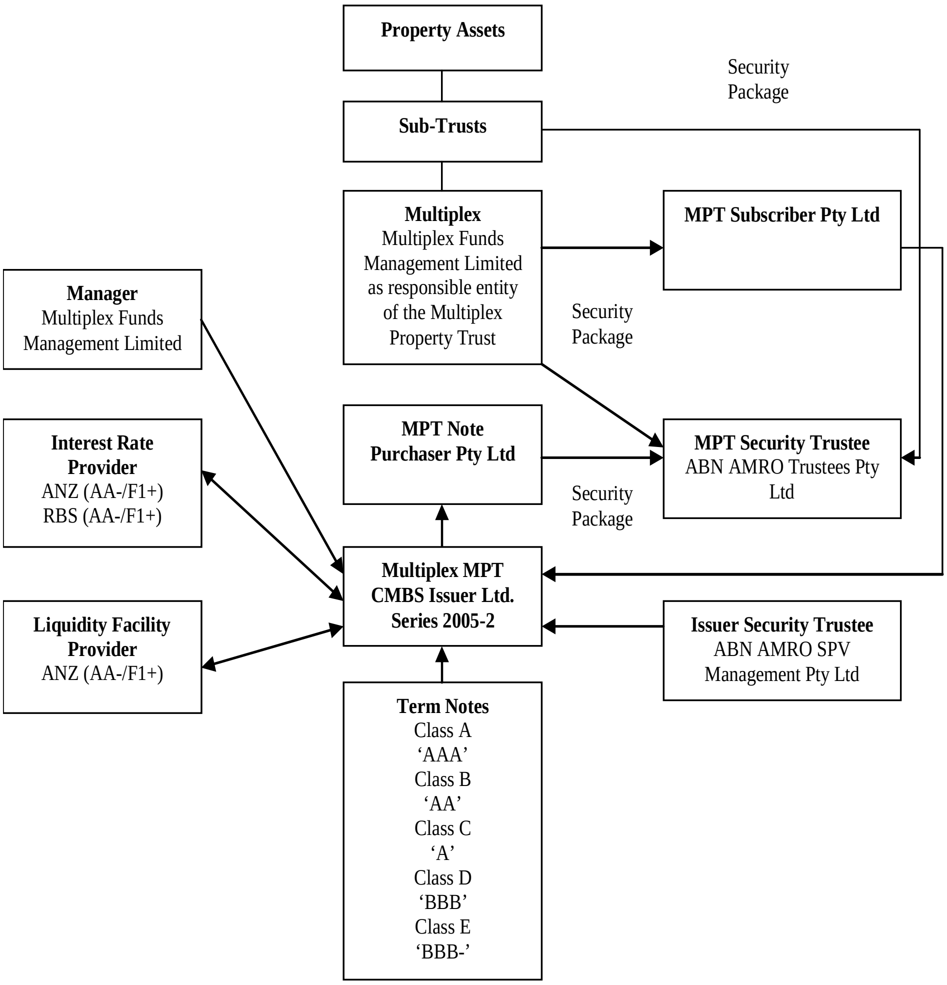
Although the above analysis was conducted on an aggregated basis for comparison of property risk assessment across various property sub-classes, this analysis can be extended to compare property risk assessment between CMBS issues. In this section, a CMBS issue is presented as a case study of how property risk can be assessed and reported with a single CMBS issue using the proposed framework. Justification of the case study methodology was presented in chapter four.

5.5.1. Background

In May 2005, Multiplex Property Trust announced the launch of a AU$1 billion CMBS issue to settle a significant portion of its bank debt. A substantial reduction in their cost of debt was also announced at a weighted average margin of 0.334% per annum

(Multiplex Property Trust 2005). The CMBS was in two series, with tranches ranging from AAA through to BBB-. Series One had a scheduled maturity of three years and Series Two five years. The CMBS was secured by 17 properties located in Sydney, Melbourne, Brisbane, Canberra and Perth, with a combined fair market value of AU$1.7 billion. The two series have a similar transaction structure. Figure 5.3 shows the transaction structure of *Multiplex CMBS Issuer Ltd. Series 2005-2*.

Figure 5.3: Multiplex CMBS Issuer Ltd. Series 2005-2 Transaction Structure



Source: Fitch Ratings (2005a; 2005b)

5.5.2 Issue Details

Details of the CMBS issues as shown in Table 5.4 were analysed using the property sub-class averages in Table 5.1 and other industry benchmarks to assess property risk.

Table 5.4: Multiplex CMBS Issuer Ltd. Series 2005-1 & 2 Issue Details

	Multiplex CMBS Issuer Ltd. Series 2005-1				**Multiplex CMBS Issuer Ltd. Series 2005-2**			
Issue Date:	May 2005				May 2005			
Term-to-Maturity:	3 years				5 years			
Property Type:	8 Office Buildings				5 Retail (30.7%)* & 4 Office (69.3%)* Buildings			
Size:	245,323 m²				196,450 m²			
Aggregate Market Value:	AU$931.7m				AU$803.5m			
Issue Size:	AU$537m				AU$463m			
Tranche:	AMOUNT	LTV	DSCR	BBSW	AMOUNT	LTV	DSCR	BBSW
AAA	AU$343m	40.6%	2.03	20bp	AU$298m	40.5%	2.01	25bp
AA	AU$61m	47.8%	1.73	30bp	AU$53m	47.7%	1.70	40bp
A	AU$54m	54.2%	1.52	40bp	AU$39m	53.1%	1.53	50bp
BBB	AU$51m	60.2%	1.37	57bp	AU$52m	60.1%	1.35	75bp
BBB-	AU$28m	63.5%	1.30	80bp	AU$21m	63.0%	1.29	90bp
Interest Type	Floating				Floating			
Occupancy Rate (OR):	98%				93%			
Weighted Average Unexpired Lease Term (WALE):	4.9 years				7.6 years			
Liquidity Facility (LF):	AU$29.5m				AU$25.5m			
Refinance constant:	9.0%				9.0%			
Largest Tenant (% of Net Income) (TC):	14%				17.9%			
Property Diversity (Largest single exposure) (PD):	AU$200m or 21.48% of portfolio value				AU$222.5m or 28% of portfolio value			
Net Income from Top 10 Tenants (CQI):	71%				54%			
Geographic Diversity:								
New South Wales	68%				57%			
Queensland	17%				22%			
Western Australia	15%				6%			
Victoria	-				8%			
Australian Capital Territory	-				7%			
Herfindahl property type index (HHPT):	1.000				0.848			
Herfindahl geographic region index (HHGR):	0.261				0.625			

Source: Standard and Poor's (2005d; 2005e) *and Fitch Ratings (2005a; 2005b)*

5.5.3 Property Portfolio

Portfolio composition of the two series is shown below and additional details are shown in Table 5.5.

Table 5.5: Multiplex CMBS Issuer Ltd. Series 2005-1 & 2 Property Portfolios

Multiplex CMBS Issuer Ltd. Series 2005-1

Property	Location	Ownership	Occupancy	% of Portfolio	Market Value (AU$m)
Goldfields House	Sydney	100	98	21.46	200.00
Jessie Street Centre	Parramantta	100	100	19.32	180.00
NRMA Centre	Sydney	50	100	14.92	139.00
AMP Place	Brisbane	100	87	12.29	114.50
KPMG Tower	Sydney	50	100	12.48	116.25
Bank West Tower	Perth	50	100	9.93	92.50
Ernst & Young Building	Perth	100	93	5.06	47.20
ANZ Centre	Brisbane	50	100	4.54	42.20
Total				**100.00**	**931.65**

Multiplex CMBS Issuer Ltd. Series 2005-2

Property	Location	Ownership	Occupancy	% of Portfolio	Market Value (AU$m)
Ernst & Young Centre	Sydney	50	88	27.7	222.50
240 Queens Street	Brisbane	100	98	15.9	127.50
15 Blue Street	Nth Sydney	100	100	10.8	87.00
Defence Plaza	Melbourne	100	100	8.1	65.00
111 Alinga Street	Canberra	100	96	6.8	55.00
King Street Wharf	Sydney	100	100	10.1	81.50
Pittwater Place	Sydney	100	86	8.0	64.0
Great Western Super Centre	Brisbane	100	96	6.4	51.0
Carillon City Shopping Centre	Perth	50	88	6.3	50.0
Total				**100.00**	**803.50**

The portfolio details were used to arrive at geographic and property diversity factors. These were then compared with the sector averages in Table 5.1.

5.5.4 Property Risk Assessment

Table 5.6 presents the results of the property risk assessment of *Multiplex CMBS Issuer Ltd. Series 2005-1* CMBS issue as an example.

Table 5.6: Property Risk Assessment in Multiplex CMBS Issuer Ltd. Series -1

Property Risk Criteria	Mitigating Strategy	Comments for Risk Mitigation
Investment Quality:		
Cross collateralisation	8 office buildings	Reduced risk of default as each of the properties support each other in instances of poor performance. Though the portfolio composition is less than the sub-sector average for 2000 - 2005 of 13, the portfolio's net income is higher than the sub-sector average by 35%.
Over collateralisation	Aggregated market value of AU$931.7m vs. total loan value of AU$537m	The total property value would have to fall under 42% to result in non-payment of principal. Property yields forecast to compress further during loan period (2005 - 2010) due to the high demand for 'prized trophy' properties and will result in growth in property values.
Occupancy rate (OR)	98%	Well above national average of 91.5% as at January 2005 for CBD offices and the sub-sector average for 2000 - 2005 of 96.4%.
Tenancy Retention	87%	MPT have shown ability to actively manage lease renewals.
LTV (AAA notes)	40.6%	Below the Australian rating parameter for commercial offices of 45%
DSCR (AAA notes)	2.03	Above the Australian DSCR rating parameter for commercial offices of 2.00. Rental growth projected to grow at about 3% over loan period guaranteeing coupon payment.
Liquidity Facility (LF)	AU$29.5m or 5.49% of issued debt	Adequate coverage of six months' of note payments and transaction expenses. The sub-sector average for 2000 - 2005 was 2.2%.
Portfolio Diversification:		
- Asset Type (HHPT)	1	Highly focussed portfolio.
- Property (PD)	21.48% of portfolio value	Single property value risk mitigated by "prized-trophy" status of property.
- Geographic (HHGR)	0.26	Well below the sub-sector average for 2000 - 2005 of 0.49.
Covenant Strength:		
Credit Quality of Income (CQI)	71.4%	Low risk of rental default due to the high percentage of credit rated tenants. Sub-sector average for 2000 - 2005 is 44.3%.
Weighted Average Lease Expiry (WALE)	4.9 years	1.9 years above loan maturity, added certainty of rental income receipt but falls short of the sub-sector average for 2000 - 2005 is 5.7 years.
Tenancy Concentration (TC)	14%	Well diversified rental income sources. Very favourable in comparison to the sub-sector average for 2000 - 2005 of 54.2%.
Depreciation and Obsolescence:	Guarantee to maintain assets to investment quality standards	Limited capital expenditure requirements over the medium term as assets are relatively new.

It has been shown that property risk in *Multiplex CMBS Issuer Ltd. Series 2005-1* can be easily compared with set benchmarks and reported using our framework. This is of benefit to guaranteeing investors of their promised principal and interest payments. Other transaction structure features, though not subject of discussion in this paper, such as insurance for full reinstatement, along with public liability and business interruption/loss of rental, borrower collection accounts, interest rate swap provision and tail periods of 18 months to cover refinancing risk, further reinforce this.

5.6 SUMMARY

The success of Australian CMBSs can largely be attributed to high property market transparency and well developed securitisation market. These features and the dominance of issuance by LPTs have contributed to greater assessment and reporting of property risk in CMBSs. However, this has to be done in a more systematic and consistent approach as shown by the proposed property risk assessment and reporting framework. The dominance of CMBSs issuance by LPTs who legally have to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity investors ensures availability of public information on property risk.

The proposed framework can be implemented on an aggregated level as well as on a single CMBS issue as illustrated by a case study on the Multiplex CMBS Issuer Ltd. Series 2005-1 & 2 issues. The framework should prove useful to rating agencies, bond issuers and institutional investors. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

Over the study period 2000-2005, investment risk was minimised by composing well diversified portfolios of mainly ‘prized-trophy’ properties as well as utilising conservative loan-to-value ratios and high debt-service-coverage ratios. Weighted average lease expiry profiles in excess of the tenure of the issued notes, adequate tenant concentrations, and ample income from investment-grade tenants, all mitigated covenant strength risk. As for depreciation and obsolescence risk, no standard feature were set though all issues provide for maintenance and capital expenditure reserves to maximise collateral quality, occupancy and value. This information can be used to benchmark property risk assessment and reporting in individual CMBS issues.

The next chapter extends risk analysis in CMBSs by empirically testing the capacity of artificial neural networks (ANN) and ordinal regression (OR) to predict credit ratings of Australian CMBSs.

CHAPTER 6

QUANTITATIVE ANALYSIS OF AUSTRALIAN CMBS CREDIT RATINGS

6.1 BACKGROUND

Bond rating agencies claim that their credit ratings reflect each agency's opinion about an issue's potential default risk and rely heavily on a committee's analysis of the issuer's ability and willingness to repay its debt and therefore researchers cannot replicate their ratings quantitatively (Kim 2005). Despite this assertion, researchers have still gone ahead and replicated bond ratings on the premise that the financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). Bond rating studies have traditionally used statistical techniques such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models to capture and model the expertise of the bond rating process. Recently, however, a number of studies have demonstrated that artificial neural networks (ANN) can be used as an alternative methodology to bond rating.

As such, the purpose of this chapter is to investigate several aspects of the use of ANN as a tool for predicting credit ratings of Australian CMBSs. Tests are undertaken to compare the predictive power of ANN models and ordinal regression (OR) models. The findings of this analysis will provide insights into what factors impact the credit rating of a CMBS issue.

6.2 LITERATURE REVIEW

ANNs are trainable analytical tools that attempt to mimic information processing patterns in the human brain. They are applied to a wide variety of pattern matching, classification, and prediction problems and are useful in many financial applications such as: stock price prediction, development of security trading systems, modelling foreign exchange markets, prediction of bond ratings, forecasting financial distress, and credit fraud detection and prevention. Comprehensive reviews of articles demonstrating the use of ANNs in various finance situations can be found in Fadlalla and Lin (2001); Coakley and Brown (2000); and Krishnaswamy et al. (2000).

Neural networks are regarded by many authoritative commentators as a useful addition to standard statistical techniques, and are in fact themselves based on statistical principles. Statistical methods such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models have been used in order to capture and model the expertise of the bond rating process. Frequently these studies are in form of comparative analysis, with researchers contrasting them with the findings and perceived efficiency of ANNs. Salchenberger et al. (1992) and Tam and Kiang (1992) state that the main advantage ANNs have over more traditional statistical methods is that they do not require priori specification of a function form, but rather they attempt to learn from the training input-output examples alone.

6.2.1 Artificial Neural Networks in Real Estate Studies

ANNs have earned a popular following amongst real estate researchers covering aspects such as real estate valuation: Tay and Ho (1991), Evans and Collins (1992), Worzala et al. (1995), Kauko (2004), Lai and Fischer (2006), Pagourtzi et al. (2007); examination of the impact of age on house values: Do and Grudnitski (1992); prediction of house value: McGreal et al. (1998), Nguyen and Cripps (2001) and Lai (2005); forecasting commercial property values: Connellan and James (1998a) and Connellan and James (1998b); predicting commercial mortgage-backed securities credit ratings: Chikolwa and Chan (2008); and the impact of environmental characteristics on real estate prices: Kauko (2003).

Most of the studies, except for Worzala et al. (1995) and Lenk et al. (1997), show that ANNs have a superior predictive capacity over traditional statistical techniques. Worzala et al. and Lenk et al. noted that ANNs were not necessarily superior over traditional statistical techniques.

The increased use of neural networks by academic and commercial analysts in real estate studies is motivated by their recognition of complex patterns of multivariate property data (Connellan & James 1998a). This increased use of ANN methodology in commercial real estate research gives credence to its extension to research in predicting CMBS bond ratings.

6.2.2 Artificial Neural Networks in Corporate Bond Studies

Rating agencies and some researchers have emphasized the importance of subjective judgement in the bond rating process and criticized the use of simple statistical models and other models derived from artificial intelligence to predict credit ratings, although they agree that such analysis provides a basic ground for judgement in general (Huang et al. 2004). Qualitative judgement, which includes accounting quality, operating efficiency, financial flexibility, industry risk, and market position, is still difficult to measure. In this sense, various quantitative methods have been applied to bond rating. Statistical methods such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models have been used in order to capture and model the expertise of the bond rating process. Literature on bond rating prediction has demonstrated that statistical models and artificial intelligence models (mainly neural networks) achieved remarkably good prediction performance and largely captured the characteristics of the bond rating process (Chaveesuk et al. 1999; Daniels & Kamp 1999; Dutta & Shekhar 1988; Huang et al. 2004; Kim 2005; Kwon et al. 1997; Maher & Sen 1997; Surkan & Singleton 1990; Yesilyaprak 2004).

Dutta and Shekhar (1988) were the first to investigate the ability of ANNs to bond rating. Their sample comprised bonds issued by 47 companies randomly selected from the April 1986 issues of Value Line Index and Standard and Poor's Bond Guide. They obtained a very high accuracy of 83.3% in discerning AA from non-AA rated bonds. However, the sample was so small that it simply amounted to showing the applicability of ANNs to bond rating.

Surkan and Singleton (1990) also investigated the bond rating abilities of neural networks and linear models. They used MDA, and found that ANNs outperformed the linear model for bond rating application.

Maher and Sen (1997) compared the performance of neural networks with that of logistic regression. ANN performed better than a traditional logistic regression model. The best performance of the model was 70% (42 out of 60 samples).

Kwon et al. (1997) compared the predictive performance of ordinal pairwise partitioning (Shopping Centre Council of Australia) approach, conventional back propagation neural network (CNN) approach and MDA. They used 2365 Korean bond-rating data and demonstrated that ANNs with OPP had the highest accuracy (71 - 73%), followed by CNN (66 - 67%) and MDA (58-61%).

Chaveesuk et al. (1999) compared the predictive power of three ANN paradigms- back propagation (BP), radial basis function (RBF) and learning vector quantisation (LVQ)- with logistic regression models (LRM). Bond issues of 90 companies were randomly selected from the 1997 issues listed by Standard and Poor's. LVQ (36.7%) and RBF (38.3%) had inferior results to BP (51.9%) and LRM (53.3%). BP only performed slightly better than LRM. They concluded that assignment of bond ratings is one area that is better performed by experienced and specialised experts since neither ANN nor LRM produced accurate results.

Daniels and Kamp (1999) modelled the classification of bond rating using ANN with one hidden layer; and a linear model using ordinary least squares (Srinivasan & Bolster). Financial figures on bonds issued by 256 companies were selected from Standard and Poor's DataStream. The percentage of correct classification ranged from 60 - 76% for ANN and 48 - 61% for OLS.

Yesilyaprak (2004) compared ANNs and MDA and multinomial logit (ML) techniques to predict ratings on 921 bonds issued by electric utility (367), gas (259), telephone (110) and manufacturing (185) companies. ANNs (57 – 73 %) performed better than both MDA (46 – 67 %) and ML (46 – 68 %) in predicting the bond rating in three samples (gas, manufacturing, and telephone). ML (68 %) performed better in predicting the bond rating in one sample (electric utility).

Huang et al. (2004) compared back propagation ANNs and vector support machine learning techniques for bond rating in Taiwan and the United States. The data set used in this study was prepared from Standard and Poor's CompuStat financial data. They obtained a prediction accuracy of 80% using ANNs.

Kim (2005) used an artificial intelligence technique, adaptive learning network (ALN), on a sample of 1080 observations (companies) primarily collected from the COMPUSTAT database, Dun and Bradstreet database, and Standard and Poor's bond manuals to predict their rating. The overall performance of the model shows that the trained ALN model was successful in predicting 228 (84%) out of 272 cases. They further showed a prediction accuracy of 88% and 91% for investment grade and speculative bonds, respectively.

In summary, most studies on using artificial intelligence techniques to predict bond rating, in particular ANNs, have shown better results than those of other classification methods. The current study attempts to extend the use of ANNs to predict ratings on CMBSs. The predictive capacity of ANNs is further compared to that of OR.

6.3 METHODOLOGY AND DATA

6.3.1 Selection of Variables

Bond rating recognises the following: profitability; liquidity; asset protection; indenture provisions; and quality of management. Bond rating models use independent variables, often calculated as ratios, which are predominantly derived from public financial statements. The assumption is that financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). Financial ratios used relate to leverage, coverage, liquidity, profitability, and size following Kaplan and Urwitz (1979). Rating agencies list qualitative factors such as management ability, value of intangible assets, financial flexibility, operating efficiency, industry risk, accounting quality and market position. However, most of these qualitative factors are likely reflected in the quantifiable data such as financial and non-financial variables, and could be assessed indirectly from analysing these quantifiable data (Kim 2005).

According to Moody's, the credit risk of CMBSs depends on the characteristics of the underlying properties, loan structure, loan-to-value (LTV) ratio and the debt service coverage ratio (DSCR) and portfolio diversification (Moody's Investor Service 2003). Standard and Poor’s as well state that their basis of rating is the relative risk of the collateral and the ability of the collateral to generate income (Standard & Poor's 2001). Measures of property portfolio diversity on the basis of property concentration, type and geographic location were introduced in chapter five.

It is acknowledged that other potential factors may be used in CMBS rating to deal with transaction and legal risk, but have not considered them in this study as there are common or standard features that have been set up to mitigate these risks in all issues.

6.3.2 Hypotheses

These hypotheses are that loan-to-value ratio (LTV) is negatively related to CMBS credit rating whereas debt-to-service coverage ratio (DSCR) is positively related. The incidence of default rises with increase in LTV; that is, if all other factors are held constant, the probability of default for a loan increases as the LTV increases, but not equally. Unlike the LTV, the incidence of default is a decreasing function of the DSCR. However, the relationship between the DSCR and the probability of default is weaker than the relationship between the LTV and default. The motivation for the specified hypothesis stems from Fabozzi and Jacob (1997) and Geltner and Miller (2001), among others, who state that LTV and DSCR are the two mostly widely used commercial mortgage underwriting criteria. Descriptions of LTV and DSCR are found in Section 5.3.5

A further hypothesis is that CMBS issues with a well diversified portfolio both on a property concentration, property composition and geographic location basis will attract higher credit ratings. The diversity of a portfolio of assets will have an impact on the volatility of the pools expected loss. Each property type will have its own distinct risk profile and market dynamic. Geographic diversity mitigates the risk single market decline and may reduce any losses associated with this type of risk. Property concentration diversity mitigates the risk of fall in asset value of the single largest property in the pool. By diversifying the concentration, type and location of property, one can mitigate a pool’s expected losses. In support of the hypotheses, Moody’s Investor Service (2003) asserts that CMBS deals also benefit from portfolio diversity.

Additional hypotheses are that size of issue and bond tenure are positively and negatively related to the success of bond issues, respectively. Larger bond issues are done by bigger firms with stronger track records who fall under stricter regulatory regimes such as the Australian Securities and Investment Commission and the Managed Investment Scheme provisions of the Corporations Act 2001, among others, should attract higher credit ratings. Longer note tenures increase the incidence of default and should therefore attract lower credit ratings.

Ordinal regressions are applied to the CMBS sample whereas prediction of accuracy in bond rating for ANN evaluates their contribution to the model. A number of models are used. Model 1 includes LTV and DSCR as independent variables. Model 2 has an addition of bond tenure and the log of issue size to the independent variables in Model 1. Finally, Model 3 has all the independent variables in Models 1 and 2 in addition to portfolio diversity variables. Tranche rating is the dependent variable in all the models.

6.3.3 Ordinal Regression Model

There is a general consensus on the inappropriateness of least squares methods to rate bonds as they ignore their ordinal nature (Kamstra et al. 2001). Ordinal regressions (OR) are considered appropriate in the analysis as they accommodate the ordinal nature of the bond ratings.

The model is similar to the general multiple linear regression model but defines Y_i and estimates β differently.

The logistic model computes the probabilities that an observation will fall into each of the various rating categories. The observation is classified into the category with the highest probability. This probability is estimated by the logistic model as:

$$\text{log}it(p_i) = \log\left[\frac{p_i}{1-p_i}\right]$$

$$= \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots\ldots \beta_n X_{in} \qquad (6.1)$$

where:

r = bond rating category;

p_i = $P\ (Y_i = r)$;

i = 1…n, where n is the sample size; and

$X_{i1,\ldots,}\ X_{in}$ are predictor variables.

The β s are estimated by maximising the log-likelihood function:

$$\sum_{i=1}^{N} P(\beta; Y_i) = \sum_{i} \ln\left(\frac{1}{1-e^{-\beta X_i}}\right) \tag{6.2}$$

where β is the vector of the parameters to be estimated. Once β's are estimated, p_i is estimated by

$$p_i = \frac{1}{1+e^{-\beta X_i}} \tag{6.3}$$

The observation is assigned to the bond rating category with the highest predicted probability. These predictions are compared to the actual bond rating assigned to the issue to calculate classification accuracy for the model.

The observed value on Y_i depends on whether or not a particular threshold has been crossed.

Y_i = BBB if Y_i^* is $\leq \beta_1$

Y_i = A if $\beta_1 \leq Y_i^* \leq \beta_2$

Y_i = AA if $\beta_2 \leq Y_i^* \leq \beta_3$

Y_i = AAA if $Y_i^* \geq \beta_3$

OR regressions were carried out in SPSS® version 13.0 (SPSS Inc. 1968)

6.3.4 Artificial Neural Network Model

This subsection contains a brief introduction to the fundamental theory of ANNs. Consider the following model:

$$y_t = g(x_t;\theta) + \varepsilon_t \tag{6.4}$$

where $g(\bullet)$ denotes a continuous differentiable function, x_t is a $k \times 1$ vector of explanatory variables, which could include the lagged dependent variables, y_{t-i} for some i, θ is a $l \times 1$ vector of parameter and ε_t is a sequence of independently, identically distributed random variables. In general, the explicit function form of g is unknown. However, it is possible to find a universal approximator, so that the function g can be estimated as accurately as one wish. One such approximator is

$$F(x_t;\gamma) = \phi_0 + \sum_{i=1}^{q} \beta_i G(x_t;\gamma_i) \tag{6.5}$$

where:

$$G(z;\nu,c) = \frac{1}{1+\exp(-\nu[z-c])} \tag{6.6}$$

is the well known logistic function. Hornik et al. (1989; 1990) (see also Carroll and Dickinson (1989), Cybenko (1989b), and Funahashi (1989)) showed that for any continuous function $g(x_t;\theta)$, every compact subset K of R^{k} and every $\delta > 0$, there exists a $F(x_t;\gamma)$ such that

$$\sup_{x \in K} \| F(x_t;\gamma) - g(x_t;\theta) \| < \delta \tag{6.7}$$

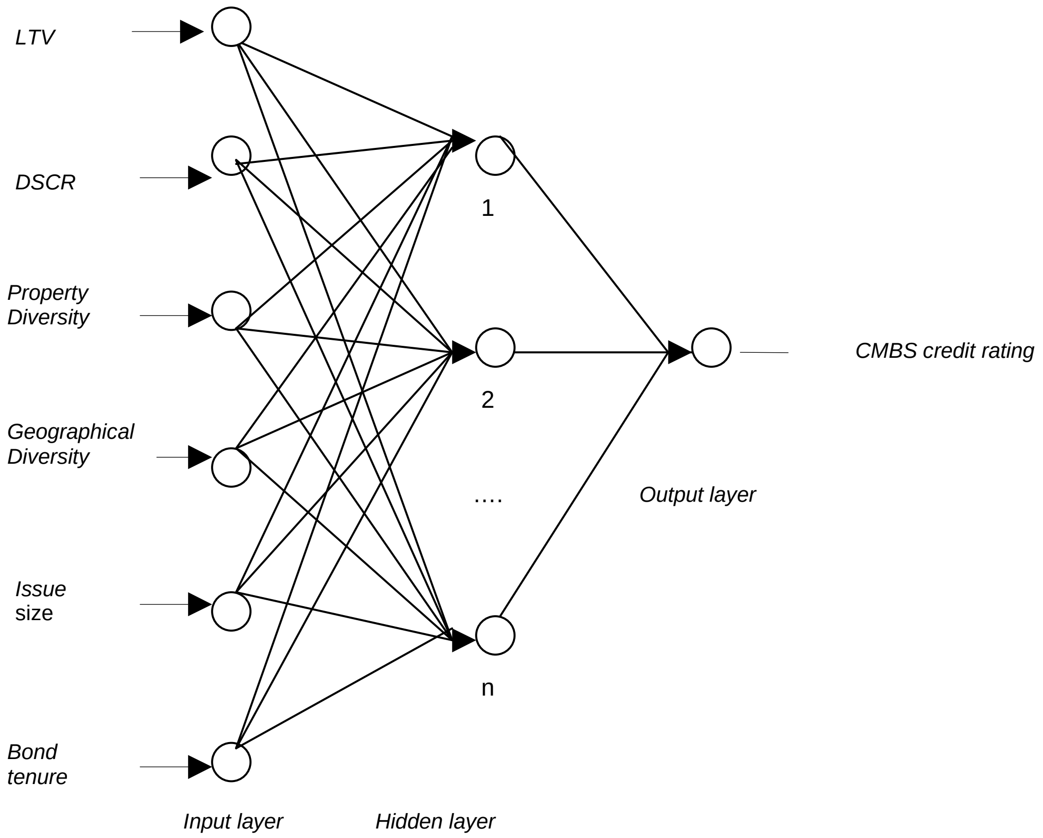
Following these results, it is straightforward to show that the accuracy of the approximation is determined by the number of hidden layer units, namely, q and the parameter vector γ, given a set of k inputs, namely, the $k \times 1$ vector x_t. The choice of q can be somewhat arbitrary, it is often a matter of striking a balance between accuracy and over-fitting. Given q, the parameter vector γ can be estimated using non-linear least squares:

$$\hat{\gamma} = \arg\min_{\gamma \in \Lambda} \sum_{t=1}^{T} (y_t - F(x_t; \gamma))^2 \tag{6.8}$$

The computational complexity of this minimisation problem grows as the number of hidden layer units grows. Several studies (refer to Weeraprajak (2007) for a comprehensive review) have suggested that the computational burden can be reduced if it is possible to separate the function $F(\bullet)$ into linear and non-linear components. In this case, the parameters associated with the linear component can be estimated using conventional least squares estimator, which has a closed form solution and the parameters in the non-linear component can be estimated using the non-linear least squares estimator. This implies the number of parameters required to be estimated by the non-linear estimator is reduced and hence improve computation efficiency.

The graphical representation of the basic ANN model with the three primary components, namely the input layer (the input/explanatory variables, x_t), the hidden layer (black box) with multiple units, $G(x_t, \gamma_i)$ and the output measure layer (the estimated CMBS rating in this case) can be found in Figure 6.1:

Figure 6.1: Structure of a CMBS Rating Neural Network



The hidden layer(s) contain two processes: the weighted summation function (the linear component); and the transformation function (the nonlinear component). Both of these functions relate the values from the input data (e.g. LTV; DSCR; issue size; bond tenure, property diversity, geographical diversity) to output measures (CMBS rating).

Alyuda Forecaster XL® (2001) was used for the ANN experimentation. In the case of our 6 input and 4 output network, the hidden units were automatically set at 29 (model 1), 28 (model 2) and 23 (Model 3).

6.3.5 Data

Based on Standard and Poor's Ratings Direct database, the dataset comprised all the CMBSs issued between July 1999 and December 2005 totalling 55 in Australia. The issues had a combined total of 137 tranches and ratings ranging from AAA, AA, A, BBB+, BBB, BBB- , to NR. In this study, all A- rated tranches were grouped into the A rated category and all BBB+ and BBB- rated tranches were grouped into the BBB rated category. The reclassification of tranches into four classes should enhance model performance because mathematical and statistical approaches have general limits in dealing with the ordinal nature of bond rating. It is known that as the number of bond classification increases, the predictive power could likely decrease (Kwon et al. 1997). Unrated tranches were excluded as their numbers, two, was insufficient to any conduct statistical analysis. The final dataset of 135 was divided into 118 tranches for the training sample and 17 tranches for the test sample, respectively. Details of the individual rating categories in each sample are shown in Table 6.1.

Table 6.1: Observations per CMBS Rating

Rating	Training Sample		Test Sample	
	Count	Proportion	Count	Proportion
A	17	14%	4	23%
AA	25	21%	3	18%
AAA	62	53%	3	18%
BBB	14	12%	7	41%
Total	**118**	**100%**	**17**	**100%**

Descriptive statistics of the data used in the experiments are shown in Table 6.2.

Table 6.2: Descriptive Statistics

Training Sample

	LTV	**DSCR**	**Property Diversity**	**Geographical Diversity**	**Issued Amount (AU$ m)**	**Bond Tenure (Years)**
Mean	0.46	2.14	0.29	0.48	79.87	3.97
Standard Error	0.01	0.05	0.02	0.01	7.36	0.12
Standard Deviation	0.10	0.51	0.18	0.15	79.90	1.31
Minimum	0.31	1.28	0.08	0.20	1.00	1.00
Maximum	0.76	3.50	1.00	1.00	350.00	7.00

Test Sample

	LTV	**DSCR**	**Property Diversity**	**Geographical Diversity**	**Issued Amount (AU$ m)**	**Bond Tenure (Years)**
Mean	0.48	1.81	0.32	0.51	47.59	4.94
Standard Error	0.02	0.09	0.04	0.06	13.33	0.06
Standard Deviation	0.07	0.36	0.18	0.26	54.96	0.24
Minimum	0.36	1.20	0.11	0.21	3.00	4.00
Maximum	0.61	2.70	0.55	0.78	190.00	5.00

Table 6.3 provides bivariate training sample correlations that exist between the data items. Statistically significant relationships exist with LTV, DSCR and the issued amount at 1%. The result show that higher LTV result in lower issued amounts; vice versa is true for DSCR.

Table 6.3: Training Sample Correlations

Variable	LTV	DSCR	Property Diversity	Geographical Diversity	Issued Amount (AU$ m)
LTV					
DSCR	-0.689(**)				
Property Diversity	0.203(*)	-0.146			
Geographical Diversity	0.073	-0.042	0.194(*)		
Issued Amount (AU$ m)	-0.465(**)	0.236(**)	0.025	-0.089	
Bond Tenure (Years)	0.037	0.070	0.108	-0.216(*)	0.037

**Indicates significant at the 1% level; *indicates significant at the 5% level.

6.4 EMPIRICAL RESULTS AND ANALYSIS

6.4.1 Ordinal Regression

The results of the ordinal regression analyses are shown in Table 6.4. To empirically specify the model, three tests were used: the standard technique of likelihood ratio test, the significance of the individual coefficients, explanatory power (pseudo R-Square) and the accuracy of the predicting rate. From the observed significance levels, only LTV is related to CMBS credit ratings being significant at .05 level of confidence in all three models but with anomalous positive coefficients implying that high LTV ratios command higher credit ratings. A negative coefficient for LTV was hypothesised as higher LTVs increases the level of default and result in lower credit ratings. Log of issued amount (SIZELN) had the anticipated positive coefficient sign whereas bond tenure (TENURE) and level of property diversity (PD) had the anticipated negative coefficients. DSCR, TENURE, PD and geographical diversity (GD) appear not be related to the rating being insignificant at .05 level of confidence. This is an interesting finding as prior literature has stipulated that LTV and DSCR are the two main predictors of CMBS default risk (Fabozzi & Jacob 1997). However, recent research by An (2006), Deng et al. (2005) and Grovenstein et al. (2004), among others, find little statistically significant relationship exists between original LTV and DSCR and CMBS default risk, supporting results of this study. They attribute this to the endogenous nature of original LTV and DSCR to the underwriting process. Lenders frequently respond to higher perceived overall risk (based on a multidimensional analysis including factors other than LTV and DSCR) by limiting the amount they will lend thereby lowering the loan-to-value ratio and increasing the debt service coverage ratio.

The low pseudo R-square in all three models (ranging from 0.018 to 0.039) indicate that there are other factors affecting CMBS bond rating, giving credence to use of other investigative techniques into their rating such as ANN. It should also be noted that addition of variables SIZELN and TENURE (model 2) to the basic model of DSCR and LTV increased the predictive power from 0.018 to 0.033. The full model with all the variables (model 3) showed a substantial increase in the predictive power (0.018 to 0.039) over the basic model though there was a marginal increase over model 2 (0.033 to 0.039).

Table 6.4: Ordinal Regression Results

Variable (Expected Sign)	**Model 1**			**Model 2**			**Model 3**		
A	1.980	(0.310)	[1.031]	3.861	(0.100)	[2.700]	4.115	(0.088)	[2.914]
AA	3.053	(0.118)	[1.952]	4.959	(0.035)	[4.428]	5.221	(0.031)	[4.664]
AAA	5.515	(0.006)	[2.006]	7.481	(0.002)	[9.545]	7.757	(0.002)	[9.768]
DSCR (+)	0.471	(0.321)	[0.983]	0.622	(0.207)	[1.593]	0.801	(0.122)	[2.393]
LTV (-)	6.268	(0.011)	[6.548]	8.307	(0.003)	[9.004]	9.512	(0.001)	[10.401]
SIZELN (+)				0.590	(0.122)	[0.331]	0.693	(0.077)	[3.130]
TENURE (-)				-0.079	(0.565)	[2.394]	-0.087	(0.553)	[0.353]
PD (-)							-1.255	(0.230)	[1.438]
GD (+)							-0.949	(0.446)	[0.580]
Chi-Square	7.036	(0.030)		9.778	(0.044)		11.495	(0.074)	
*Pseudo R-Square	0.018			0.033			0.039		

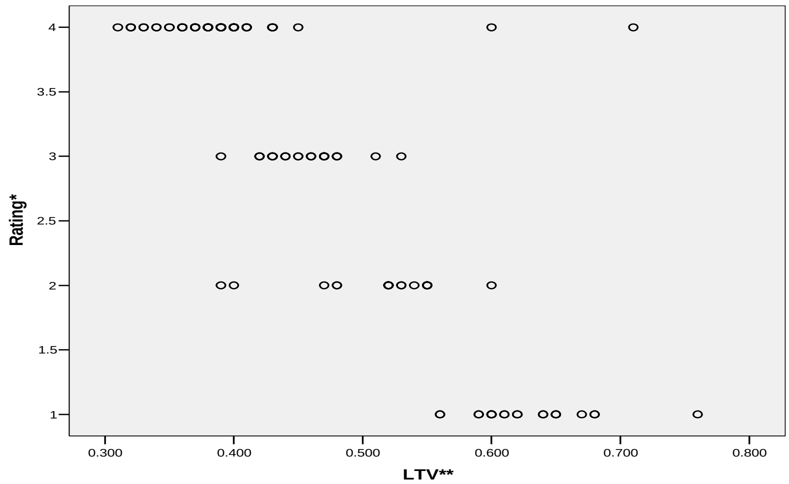
*We utilise McFadden's pseudo R-Square based on Ederington (1985) who recommend it as being the most attractive intuitively as well as theoretically of all others. Regression coefficients provided with significance levels (in parenthesis) and Wald chi-square [in brackets].

The inclusion of additional variables to the basic model increased chi-square from 7.036 (model 1) to 9.778 and 11.495 (model 2 and 3) respectively though significance levels decreased. Models 1 and 2 chi-square were significant at the 0.05 level and model 3 at the 0.10 level.

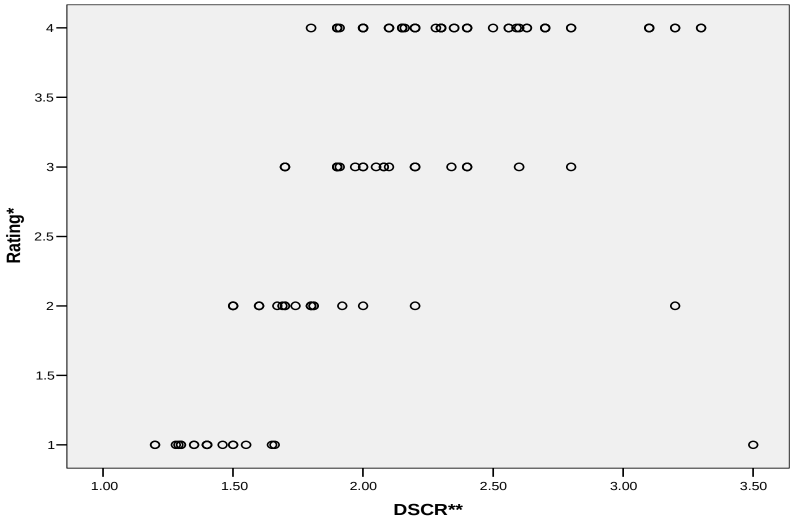
These results imply that rating agencies use only some of variables they describe or indicate as important to CMBS rating. Further, the suggested variables do not generally (with exception of LTV and to some extent DSCR) discriminate among credit ratings. This is exemplified by Figure 6.2 a-f. There is a strong relationship between CMBS rating and LTV, whereas a weak relationship exists with DSCR. The other variables show no relationship to CMBS rating.

Figure 6.2: Variable Scatter Plots

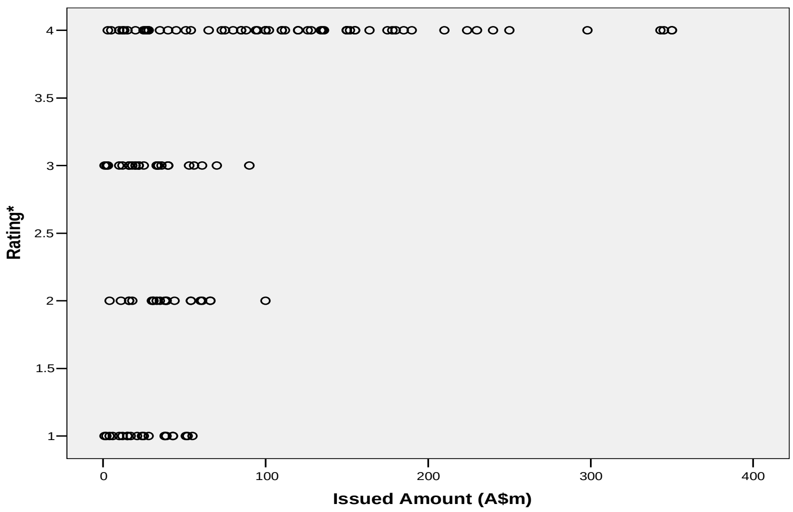
a) CMBS Rating vs. LTV (Strong relationship)



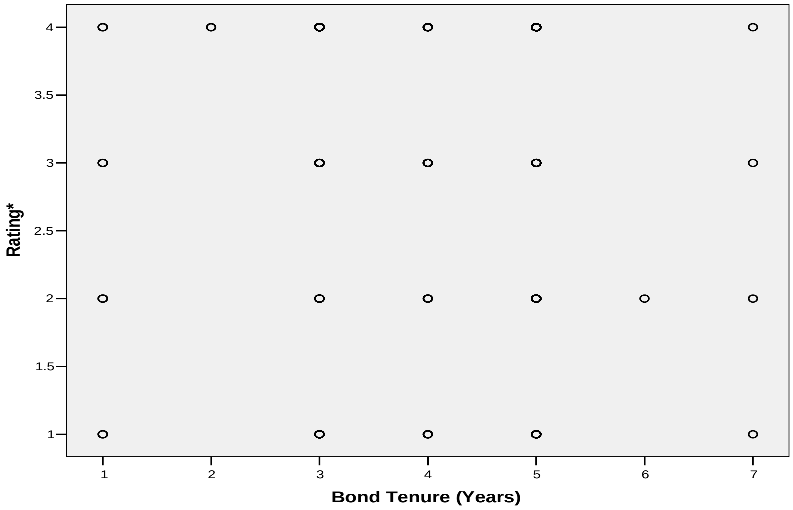
b) CMBS Rating vs. DSCR (Weak relationship)



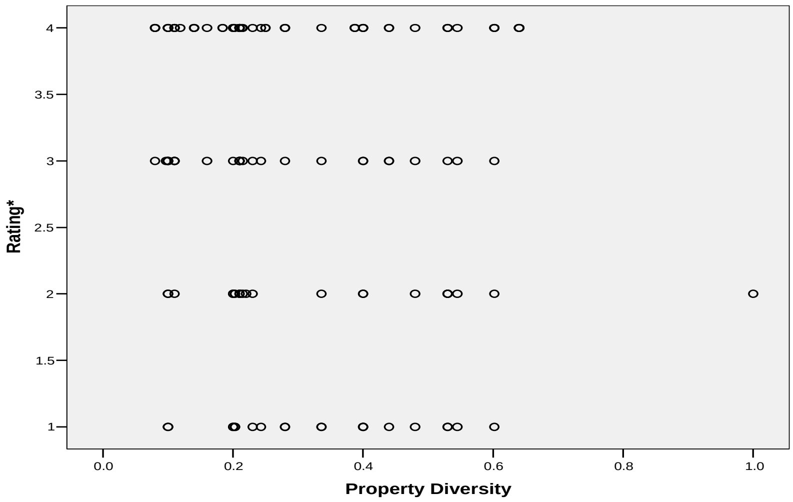
c) CMBS Rating vs. Issued Amount (No relationship)



d) Rating vs. Bond Tenure (No relationship)



e) CMBS Rating vs. Property Diversity (No relationship)



f) CMBS Rating vs. Geographical Diversity (No relationship)

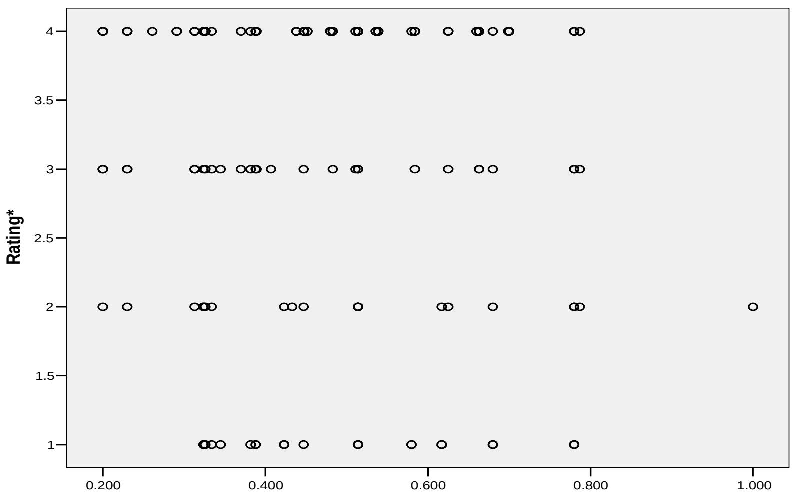


Table 6.5 shows the number of ratings correctly predicted. The best results was obtained by model 3 which included all the variables at 53% (63 out of 118 cases) followed by models 1 and 2 at 52% (61 out of 118 cases) each. Further, the models could only predict the AAA and BBB notes, with a higher predictive capacity for the AAA notes.

Table 6.5: OR Classification Accuracy of Models 1 - 3

Model 1

Actual CMBS Rating	**Predicted CMBS Rating**			
	AAA	BBB	Total	Correctly Predicted (%)
BBB	17	2	19	11%
A	17	0	17	0%
AA	23	0	23	0%
AAA	59	0	59	100%
Total	116	2	118	52%

Model 2

Actual CMBS Rating	**Predicted CMBS Rating**			
	AAA	BBB	Total	Correctly Predicted (%)
BBB	16	3	19	16%
A	17	0	17	0%
AA	23	0	23	0%
AAA	58	1	59	98%
Total	114	4	118	52%

Model 3

Actual CMBS Rating	**Predicted CMBS Rating**			
	AAA	BBB	Total	Correctly Predicted (%)
BBB	15	4	19	21%
A	17	0	17	0%
AA	23	0	23	0%
AAA	59	0	59	100%
Total	114	4	118	53%

6.4.2 Artificial Neural Networks

6.4.2.1 Prediction Accuracy of Analysis

ANN is used to predict credit ratings using three models. The basic model has two independent variables, LTV and DSCR. The second model includes bond tenure (TENURE) and log of issue size to the independent variables in Model 1. Finally, Model 3 has all the independent variables used in Models 1 and 2 in addition to portfolio diversity variables. Tranche rating is the dependent variable in all the models.

The predictive capacity of ANNs decreased from 95% (models 1 and 2) to 93% (model 3) for the training set and test and increased from 70% (model 1) to 80% (model 2 and 3) for the test set as shown in Table 6.6. Further Tables 6.7 shows the classification of accuracy within individual rating categories.

Table 6.6: Summary of ANN Results

Model	Training Sample		Test Sample	
	No. of Good Predictions	No. of Bad Predictions	No. of Good Predictions	No. of Bad Predictions
Model 1	93(95%)	5(5%)	14(70%)	6(30%)
Model 2	93(95%)	5(5%)	16(80%)	4(20%)
Model 3	91(93%)	7(7%)	16(80%)	4(20%)

Table 6.7: ANN Classification Accuracy

Model 1

Actual CMBS Rating	Predicted CMBS Rating					
	AAA	AA	A	BBB	Total	Correctly Predicted (%)
BBB	0	0	0	19	19	100%
A	1	5	11	0	17	65%
AA	0	22	1	0	23	96%
AAA	55	3	1	0	59	93%
Total	56	30	13	19	118	91%

Model 2

Actual CMBS Rating	**Predicted CMBS Rating**					
	AAA	AA	A	BBB	Total	Correctly Predicted (%)
BBB	1	0	0	18	19	95%
A	1	3	11	2	17	65%
AA	2	21	0	0	23	96%
AAA	59	0	0	0	59	100%
Total	63	24	11	20	118	92%

Model 3

Actual CMBS Rating	**Predicted CMBS Rating**					
	AAA	AA	A	BBB	Total	Correctly Predicted (%)
BBB	1	0	0	18	19	95%
A	1	3	12	1	17	71%
AA	1	20	2	0	23	87%
AAA	57	0	2	0	59	97%
Total	60	23	16	19	118	92%

Table 6.8 shows the error distributions for each of the three models. No clear explainable reason can be given for the high percentage of errors on A rated notes.

Table 6.8: ANN Error Distribution

Model 1

Class	No. of Cases	No. of Errors	% Errors
AAA	59	4	6.78%
AA	23	1	4.35%
A	17	6	35.29%
BBB	19	0	0.00%
Total	118	11	9.32%

Model 2

Class	No. of Cases	No. of Errors	% Errors
AAA	59	0	0.00%
AA	23	2	8.70%
A	17	6	35.29%
BBB	19	1	5.26%
Total	118	9	7.63%

Model 3

Class	No. of Cases	No. of Errors	% Errors
AAA	59	2	3.39%
AA	23	3	13.04%
A	17	5	29.41%
BBB	19	1	5.26%
Total	118	11	9.32%

Further Table 6.9 shows a comparison of the OR and ANN results, depicting the superiority of ANN across all the three models.

Table 6.9: Prediction Accuracy Summary: OR vs. ANN

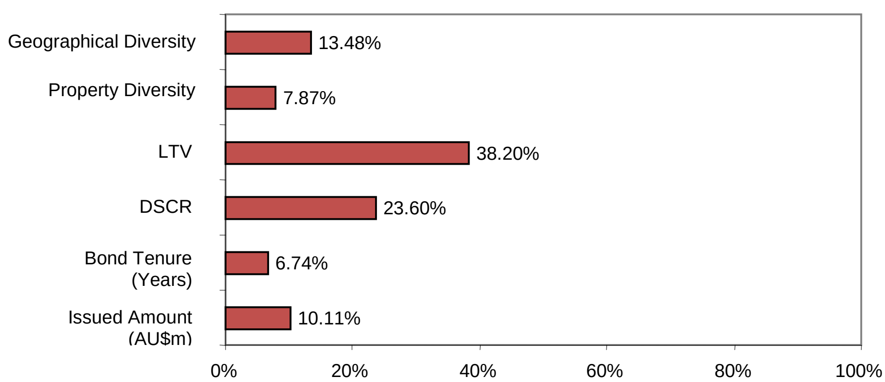
	OR	ANN
Model 1	52%	91%
Model 2	52%	92%
Model 3	53%	92%

6.4.2.2 Variable Contribution Analysis

Though earlier literature and publications by credit rating agencies state that LTV and DCSR are important property ratios which impact on the achievable credit rating for a CMBS issue, to the best of knowledge no study has empirically examined the relative contribution of each of these input parameters to a CMBS rating. This study thus evaluates the relative importance of different factors considered in the CMBS rating using a neural network model.

Garson (1991) developed a means whereby connection weights within a neural network can be interpreted allowing the effect of various input nodes to be examined and ranked according to their relative importance. This is intrinsically done in Alyuda Forecaster XL®. The results of the relative importance of these variables in our full neural network model (model 3) are shown in Figure 6.3. In order to maintain brevity, results of the other two models are not shown but suffice to state that the following order of importance was revealed though at various percentages: LTV, DSCR, Issued Amount and Bond Tenure.

Figure 6.3: CMBS Credit Rating Variable Contribution



The study has shown that 62% of a CMBS rating is attributable to LTV (38.2%) and DSCR (23.6%); supporting earlier studies which have listed the two as being the most important variables in CMBS rating. The other variables contributions are: geographical diversity (13.5%) and property diversity (7.9%), CMBS issue size (10.1%), CMBS tenure (6.7%), respectively.

The results of this study are comparable to those stated in the ABN AMRO CMBS Rating Model. Under their model all the property-based factors added up to 75% (asset quality (15%); refinancing risk (20%); lease expiry profile (15%); credit quality of income (15%) and tenancy concentration (10%). All these factors are captured by LTV and DSCR in the full model of this study as earlier discussed in Section 5.2. They have a combined total weighting of 62%. In the full model of this study, geographical and property diversity accounted for 21% whereas the ABN AMRO model had 15%. Differences between full model of this study and the ABN AMRO model with the remaining factors makes it difficult to complete the comparisons comprehensively. The full model captures bond tenure and amount issued. The ABN AMRO model captures management experience and growth strategy.

One drawback observable from Figure 6.3 is that no signs are attached to the calculated weights. Thus the interpretation of the relative weights can be inferred from OR analysis.

6.5 SUMMARY

Superior predictive results were obtained from the ANN analysis in comparison to a standard OR. ANN correctly predicted 95% and 91% CMBS rating for the training and test sets respectively whereas OR had 52 - 53% for the training set across the three models, confirming results obtained in earlier studies on predicting corporate bond rating using the two methodologies. Further, ANNs offer better results classifying across rating classes, while OR perform better only at the AAA class level and perform poorly for lower classes.

The empirical test of variables propagated by credit rating agencies as being important to CMBS rating found all but LTV to be statistically insignificant using OR. A conclusion can therefore be drawn that statistical approaches used in corporate bond rating studies have limited replication capabilities in CMBS rating and that the endogenous argument raises significant questions about LTV and DSCR as convenient, short-cut measures of CMBS default risk. However, ANNs do offer promising predictive results and can be used to facilitate implementation of survey-based CMBS rating systems. This should contribute to making the CMBS rating methodology more explicit which is advantageous in that both CMBS investors and issuers are provided with greater information and faith in the investment. Although the results of this study cannot be viewed as definitive due to the small sample size, they can form a basis for future studies. Over time with more CMBS issuances, a larger sample size will enable analysis of various issues backed by different property classes to check for differences, if any.

In order to validate the methodology adopted to show the interpretation of the bond-rating process obtained from the models in this chapter, the next chapter extends the approach to predict LPT bond ratings.

CHAPTER 7

QUANTITATIVE ANALYSIS OF AUSTRALIAN LPT BOND RATINGS

7.1 BACKGROUND

Debt funding, through direct bank borrowings and issuance of CMBS and unsecured bonds, has played a significant role in the growth of Australian LPTs as shown in chapter two. Furthermore, chapter six empirically analysed credit ratings on CMBS using OR and ANNs to examine the informational content they convey to would-be investors. The same analysis is extended to LPT bonds to validate the adopted methodology and to show the prominence of LPT bonds as an alternative investment vehicle and a debt funding tool.

The significance of LPT bonds as an investment vehicle and a debt funding tool was covered in chapter two and literature review on the application of ANNs in real estate studies and corporate bond ratings covered in chapter six.

To the best of knowledge, only three studies have examined credit ratings using Australian data (Chikolwa & Chan 2008; Gray et al. 2006; Matolcsy & Lianto 1995). Chikolwa and Chan (2008) find that rating agencies use only a subset of variables they describe or indicate as important to rating CMBS[18] and show the superiority of ANNs over ordinal regressions in predicting CMBS ratings. Gray et al (2006) find that interest coverage and leverage ratios have the most profound effect on credit ratings, using an ordered probit regression. Matolcsy and Lianto (1995) examine the incremental information content of bond rating revisions on stock prices, after controlling for accounting information, using a cross-sectional regression approach. Their finding that only rating downgrades have informational content is consistent with other studies such as Hand,` et al. (1992).

[18] Only Loan-to-value (LTV) ratio was found to be statistically significant.

As such, the purpose of this chapter is to investigate the several aspects of the use of ANNs as tools for predicting credit ratings of Australian LPT bonds. Tests are undertaken to compare the predictive power of ANN models and OR models. The findings of this analysis will provide insights in what factors impact on the credit rating of LPT bonds.

7.3 DATA AND METHODOLOGY

7.3.1 Data

The initial sample comprised of all 87 Standard and Poor's rated bonds issued by Australian LPTs between 1999 and 2006 as found in the *Property Australia* magazine. After removing bonds that had incomplete financial information, the sample was reduced to 77. Concurrent and complete financial report information for the period 1999 to 2006 is obtained from the Aspect FinAnalysis database. In line with Gray et al. (2006), an annual financial report is defined as being contemporaneous with the rating if it relates to the financial year-end that occurs three to fifteen months prior to the rating is followed. This ensures that any changes based on information released in the annual report are captured in the corresponding rating. Three-year averages of relevant financial ratios rather than the most recent observations are used in line with the 'rating-through-the-cycle' process which is adopted by credit rating agencies to capture the longer-term perspective (Carey & Hrycay 2001; Carey & Treacy 2000). Rating-through-the-cycle is described as a rating assessment in a worst case scenario, in the bottom of a presumed credit quality cycle.

In order to have a reasonable number of observations in each rating class, the agency rating classes A, A+ and A3* are combined into a single rating class A, and the agency-rating classes BBB and BBB+ are combined into a single rating class BBB+. Further, the reclassification of tranches into three classes could enhance model performance because mathematical and statistical approaches have general limits in dealing with ordinal nature of bond rating. It known that as the number of bond classification increases, the predictive power could likely decrease (Kwon et al. 1997). Table 7.1 provides summary statistics over time and by sector.

Table 7.1: Distribution of Sample Observations over Time, Rating Class and Sector

	A	A-	A+	A3*	BBB	BBB+	***Total***
			Panel A: LPT Bond Rating by Year				
1999	1					1	***2***
2000	1						***1***
2001	2	7				3	***12***
2002	4	2	3	1		2	***12***
2003	4	19				5	***28***
2004	1	4				4	***9***
2005	3	3				6	***12***
2006	1	4			2	4	***11***
Total	***17***	***39***	***3***	***1***	***2***	***25***	***87***
			Panel B: LPT Bond Rating by Sector				
Diversified	3	15	3		2	16	***39***
Office		6		1		9	***16***
Retail	14	18					***32***
Total	***17***	***39***	***3***	***1***	***2***	***25***	***87***

7.3.2 Selection of Variables

Consistent with information provided by Standard and Poor's (2007) and Moody's Investor Service (2002) and with the approach used by Gray et al. (2006), LPT credit rating is modelled as a function of its financial characteristics given by interest coverage, profitability and leverage and industry characteristics. Credit ratings tend to be highly sensitive to the firm's interest coverage ratio- firms with higher coverage ratios are likely to have higher credit ratings. Profitability is another signal of the firm's ability to generate cash to meet its financial obligations- a high profitability ratio is more highly to be associated with a better credit rating. Cash flow or debt coverage ratios, such as free cash flows relative to total debt, are important in credit analysis as they provide an indication of the firm's present ability to service its debt and meet its financial obligations. A low cash-flow-to-debt ratio may be symptomatic of higher risk and a signal of weak prospects. High cash flow relative to total debt is associated with higher credit ratings. Further, higher leverage factors, measured as debt to total assets, reduce the cushion the firm has with respect to any incremental changes in its fortunes. Higher leverage is associated with lower credit ratings. In addition, long-term debt leverage is generally higher for firms with lower ratings.

Blume et al (1998) hypothesise that a firm with higher equity beta is expected to have a lower credit rating as it will be less able to service its debt for given accounting ratios as its equity risk increases. However, there have been inconsistent results in prior literature of using equity beta as a predictor variable in credit rating. Earlier studies (KU) found it to be a significant variable in credit rating prediction, while recent studies (Crabtree & Maher 2005; Gray et al. 2006; Maher & Sen 1997) have all found the equity beta to be insignificant. As such our models do not include an equity beta a predictor variable.

The log of assets provides a robust measure of firm size, while at the same time providing a rational proxy for information asymmetry in view of the fact that information asymmetry typically decreases as a firm size increases (Krishnaswami et al. 1999). As such we hypothesise that bonds issued by large LPTs by asset size should command higher ratings.

Rating agencies suggest that credit ratings should depend, in part, on the firm's business environment. Numerous industry characteristics including competitiveness, barriers to entry, exposure to technological change, regulatory environment and vulnerability to economic cycles can have a significant influence on the level of business risk a firm faces (Gray et al. 2006; Iskander & Emery 1994). For instance, Moody's Investor Service (2003) find competitive pressures, characteristics of the catchment areas, and expectations of future developments to have a greater impact in their rating of retail LPTs and vacancy rates, tenant demand trends, and future stock additions on office LPTs. Retail LPTs exhibit greater cash flow stability than office or industrial LPTs, given Australia's relatively steady consumer spending trends as well as the long-term nature of their lease structures. Consequently, an office LPT is expected to generate higher debt coverage ratios at a given level. A more stable and predictable cash flow should translate into a lower level of business risk and hence a lower credit risk. To control for possible LPT sector effects, indicator variables (0,1) for each LPT sector in the sample are included. An LPT sector dummy (0,1) is added as an independent variable to the benchmark model for two (i.e. n - 1) groups

Stapled securities[19] account for over 75% of the LPT market capitalisation, compared to only 29% in 2004 (Newell 2006a). Tan (2004b) showed that the adoption of this internal management structure has enabled a closer alignment of unit holders and manager interests, no fee leakage and a lower cost of capital. Further, Newell (2006a) states that the adoption of the internal management structure has not increased LPT risk levels. However, Standard and Poor's (2007) assert that LPTs exposure to non-lease-related income may constrain their credit rating as these activities carry much higher business risk than traditional, passive asset management, which reduces the firm's percentage of income-producing assets and its debt capacity at all rating levels. To control for possible LPT stapled-structure effects, indicator variables (0,1) for each LPT stapled-structure in the sample are included. An LPT stapled-structure dummy (0,1) is added as an independent variable to the benchmark model for one (i.e. *n* - 1) group.

Descriptive statistics regarding the sample are provided in Panel A and variable definitions in Panel B of Table 7.2.

Table 7.2: Descriptive Statistics and Variable Definitions

Variable		Minimum	Maximum	Mean	Std. Dev.
Panel A: Descriptive Statistics					
NS		1.05	3.74	2.27	0.78
DA		0.08	0.38	0.23	0.07
OCD		0.08	0.52	0.24	0.08
TA	~	8.89	9.96	9.56	0.29
LS_1		0.00	1.00	0.18	0.39
LS_2		0.00	1.00	0.32	0.47
SS		0.00	1.00	0.68	0.47

Panel B: Variable Definitions

NS	3-year average of net tangible assets per share.
DA	3-year average of total debt divided by 3-year average of LPT total assets.
OCD	3-year average of operating cash flow divided by 3-year average of total debt.
TA	Natural log of 3-year average of total assets.
LS_1	Indicator variable set equal to 1 if the bond is backed by an office LPT, 0 otherwise.
LS_2	Indicator variable set equal to 1 if the bond is backed by an retail LPT, 0 otherwise.
SS	Indicator variable set equal to 1 if the bond is backed by an LPT with a stapled structure, 0 otherwise.

~ In millions

[19] Stapled securities are formed via stapling the units in a LPT to the shares of the management company. Unit holders of stapled securities benefit from incomes derived from purely property investment and from other activities such as property development.

Table 7.3 provides the bivariate correlations that exist between the data items.

Table 7.3: Spearman Correlation Coefficients

	NS	**DA**	**OCD**	**TA**	**LS_1**	**LS_2**
DA	-0.083					
OCD	-0.154	-.745(**)				
TA	.610(**)	0.180	-0.028			
LS_1	-.514(**)	.363(**)	-.265(*)	-.350(**)		
LS_2	-.274(*)	0.101	0.099	0.015	-.327(**)	
SS	.772(**)	-0.089	0.027	.662(**)	-0.177	-.408(**)

**Indicates significance at the 1% level, * indicates significance at 5% level.

A number of models are used. Our benchmark Model 1 includes net tangible assets per share (NS), Total debt/total assets (DA), operating cash flows/total debt (OCD) and log of total assets (TA) as independent variables. Model 2 tests whether the office LPT sector (LS_1) has an impact on bond rating. We further test whether retail LPT sector (LS_2) has an impact on bond rating in Model 3. In model 4, test the combined effect on LPT sector (LS_1 and LS_2) have on LPT bond rating. Finally, Model 5 has all the independent variables in Models 1 to 4 in addition to the stapled-structure (SS) variable. LPT bond rating is the dependent variable in all the models.

Ordinal regressions are applied to the LPT bond sample whereas prediction of accuracy in bond rating for ANN evaluates their contribution to the model.

7.3.3 Description of OR Model

Details of the OR model are covered earlier in Section 6.3.2, with the only difference being LPT bond rating categories, Y_i.

The observed value on Y_i depends on whether or not a particular threshold has been crossed.

Y_i = BBB+ if Y_i^* is $\leq \beta_1$

Y_i = A- if $\beta_1 \leq Y_i^* \leq \beta_2$

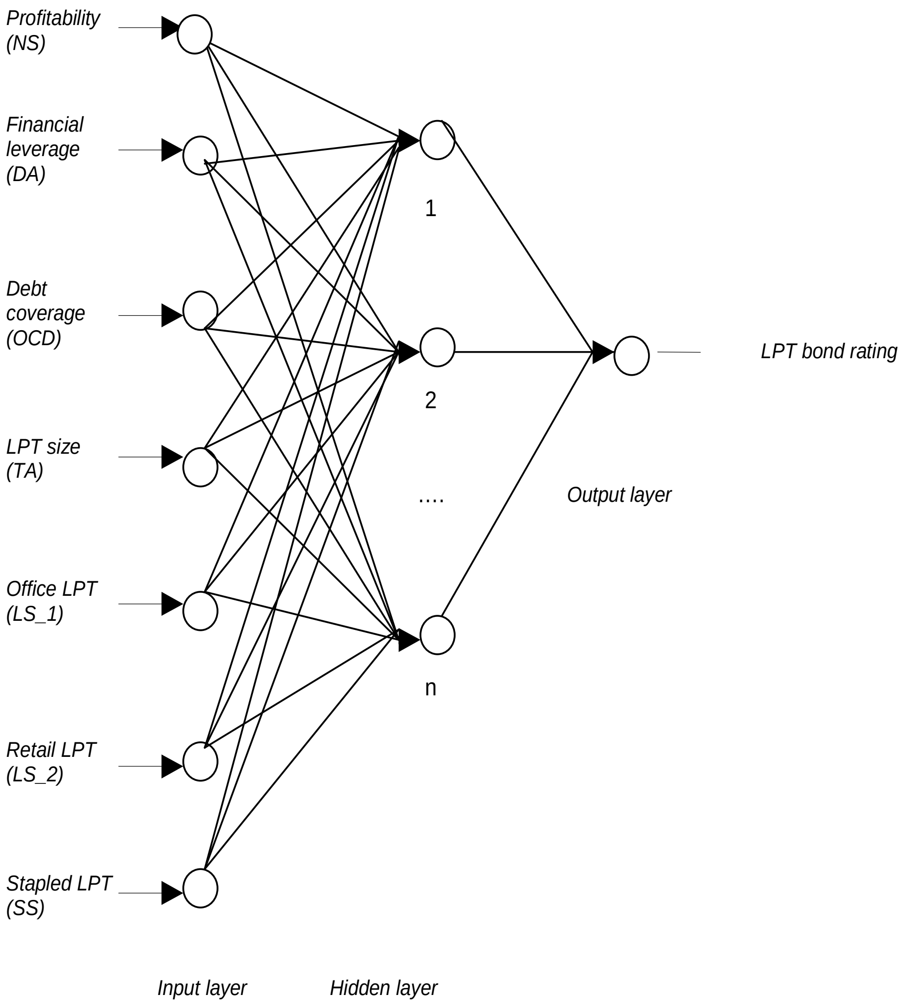
Y_i = A if $Y_i^* \geq \beta_2$

OR regressions were where carried out in SPSS® version 15.0 (SPSS Inc. 1968).

7.3.4 Description of ANN Model

Similarly details of theory behind ANN are covered in Section 6.3, with graphical representation of the basic ANN model with the three primary components, namely the input layer (the input/explanatory variables, x_t), the hidden layer (black box) with multiple units, $G(x_t, \gamma_i)$ and the output measure layer (the estimated LPT bond rating in this case) (Figure 7.1):

Figure 7.1: Structure of a LPT Bond Rating Neural Network



The hidden layer(s) contain two processes: the weighted summation functions and the transformation functions (the nonlinear component). Both of these functions relate the values from the input data (NS, DA, OCD, TA, LS_1, LS_2 and SS variables) to output measures (LPT bond rating).

Alyuda Forecaster XL® (Alyuda Research Inc. 2001) was used for the ANN experimentation. In the case of our 4-7 input and 3 output network, the hidden units were automatically set at 9 (model 1), 12 (model 2), 33 (Model 3), 33 (model 4) and 6 (model 5).

7.4 EMPIRICAL RESULTS AND ANALYSIS

7.4.1 OR

The results of the ordinal regression analyses are shown in Table 7.4. To empirically specify the model, three tests were used: the standard technique of likelihood ratio test, the significance of the individual coefficients, explanatory power (pseudo R-Square) and the accuracy of the predicting rate.

Table 7.4: OR Results

Variable (Expected Sign)	Model 1	Model 2	Model 3	Model 4	Model 5
A-	37.741	37.959	66.040	98.773	115.803
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
	[13.224]	[13.062]	[23.116]	[26.309]	[10.888]
A	39.160	39.378	68.050	101.774	120.730
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
	[14.029]	[13.856]	[24.007]	[26.981]	[11.505]
Profitability (NS)	1.026	1.011	2.974	6.663	18.749
(+)	(0.014)	(0.022)	(0.000)	(0.000)	(0.000)
	[5.996]	[5.272]	[23.300]	[31.959]	[19.956]
Financial leverage (DA)	-18.475	-18.206	-22.858	-47.179	-108.561
(-)	(0.007)	(0.010)	(0.002)	(0.000)	(0.000)
	[7.234]	[6.665]	[9.352]	[18.071]	[13.025]
Debt coverage (OCD)	11.565	11.509	14.048	23.334	51.465
(+)	(4.729)	(0.030)	(0.020)	(0.005)	(0.004)
	[0.030]	[4.685]	[5.445]	[7.893]	[8.320]
LPT size (TA)	3.513	3.539	6.933	10.771	13.002
(+)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
	[9.443]	[9.377]	[21.043]	[26.800]	[12.387]
Office LPT (LS_1)		0.115		-7.731	-23.554
		(0.874)		(0.000)	(0.000)
		[0.025]		[21.822]	[14.660]
Retail LPT (LS_2)			-3.547	-8.588	-16.273
			(0.000)	(0.000)	(0.000)
			[24.257]	[30.982]	[19.318]
Stapled LPT (SS)					13.295
					(0.000)
					[15.774]
Chi-Square	21.908	21.935	50.956	83.183	123.581
*Pseudo R-Square	0.131	0.132	0.306	0.499	0.741

*We utilise McFadden's pseudo R-Square based on Ederington (1985) who recommend it as being the most attractive intuitively as well as theoretically of all others. Regression coefficients provided with significance levels (in parenthesis) and Wald chi-square [in brackets].

The primary control variables (NS, DA, OCD and TA) are all significant at .05 level in the predicted direction. The industry-based variables (LS_1, LS_2 and SS) are each found to be significant when added individually and together to the benchmark model., In results not shown in this study to maintain brevity, year of bond issue and size of bond issue are found to be statistically insignificant. All the models are significant at .05 level with Likelihood Ratios ranging between 21.9 and 123.5. These results are comparable to other studies (Blume et al. 1998; Crabtree & Maher 2005; Gray et al.

2006) that have found debt coverage (OSD), leverage (DA) and profitability (NS) to provide explanatory power in the credit rating process. In addition, the significance of the log of LPT total assets (TA) suggests that larger LPTs will command higher credit ratings confirming information asymmetry supposition by Krishnaswami et. al (1999).

The benchmark model 1 had a low pseudo R-square of 0.131 and adding the LPT sector variables individually significantly raised the pseudo R-square to 0.132 and 0.306 respectively (models 2 and 3). A further marked difference in pseudo R-square (0.499) was noted when the two LPT sector variables (LS_1 and LS_2) were added to the benchmark model together (model 4). Overall, model 5 which incorporated all the industry-based variables (LS_1, LS_2 and SS) showed the best pseudo R-square result at 0.741.

These results are consistent with the interpretation that retail LPTs have more stable cash flows than office LPTs and the bonds they issue should command higher ratings. Further, despite Standard and Poor's (2007) assertion that LPTs with exposure to non-lease-related income may constrain their credit rating, results of this study show that the bonds issued by LPTs with stapled management structures command higher credit ratings. A possible explanation would be the higher anticipated returns from LPTs with stapled management structures. To investigate the effects of these industry-based predictability measures on bond ratings further, the incremental effect each variable has on bond rating prediction accuracy is examined.

The predictive capacity increased from the model 1 (56%) to the full model 5 (91%). The other models had the following prediction accuracy rates: model 2 (60%), model 3 (72%) and model 4 (91%). Table 7.5 compares the prediction accuracies across bond rating classes for all the models. The benchmark model 1 has a higher predictive capacity for the lower rated bonds (BBB+ and A-) and performs poorly for the higher rated notes (A). Models 2 and 3 shows that bonds issued by an office LPT are more likely to be rated BBB and those issued by retail LPTs rated A-. Further, the full model shows 66% likelihood of the bonds being rated either BBB+ or A-.

Table 7.5: OR Classification Accuracy of Models 1 – 5

	BBB+	A-	A	Correctly Predicted (%)
Model 1	22/24 (92%)	21/32 (66%)	0/21 (0%)	56%
Model 2	22/24 (92%)	21/32 (66%)	3/21 (14%)	60%
Model 3	20/24 (83%)	26/32 (81%)	9/21 (43%)	72%
Model 4	22/24 (92%)	30/32 (94%)	18/21 (86%)	91%
Model 5	23/24 (96%)	28/32 (88%)	19/21 (90%)	91%

7.4.2 ANN

Analysis were done using the five models as defined in Section 7.3.2 on our initial 77 sample which was divided into 54 (70%) as training and 23 (30%) test samples. Results of the model prediction accuracies and variable contribution are shown below.

7.4.2.1 Prediction Accuracy Analysis

All the models had 96% prediction accuracy for the training sample (Table 7.6). The predictive capacity of models increased from 52% (models 1) to 73% (model 5) for the test set emphasising the importance of the inclusion of industry-based variables in the models. The other models had the following results for their test samples: model 2 (61%), model 3 (70%) and model 4 (77%).

Table 7.6: Summary of ANN Results

Model	Training Sample		Test Sample	
	No. of Good Predictions	No. of Bad Predictions	No. of Good Predictions	No. of Bad Predictions
Model 1	52(96%)	2(4%)	12(52%)	11(47%)
Model 2	52(96%)	2(4%)	14(61%)	9(39%)
Model 3	52(96%)	2(4%)	16(70%)	7(30%)
Model 4	52(96%)	2(4%)	17(77%)	5(22%)
Model 5	52(96%)	2(4%)	19(73%)	4(17%)

Table 7.7 shows the classification of accuracy within individual rating categories, with highest being for the *A* rating class at 76% - 100%. This is followed by the *A*- rating class which has a range of 88% - 94% and finally the BBB+ rating class at 58% - 92%. These results are comparable to those obtained in OR; see Table 7.5. ANN predicts better at higher rating classes (A and A-) than at the lower class (BBB+), which is the opposite for OR.

Table 7.7: ANN Classification Accuracy of Models 1 – 5

	BBB+	**A-**	**A**	**Correctly Predicted (%)**
Model 1	14/24 (58%)	30/32 (94%)	20/21 (95%)	83%
Model 2	16/24 (67%)	30/32 (94%)	20/21 (95%)	86%
Model 3	22/24 (92%)	30/32 (94%)	16/21 (76%)	88%
Model 4	22/24 (92%)	28/32 (88%)	20/21 (95%)	91%
Model 5	20/24 (83%)	30/32 (94%)	21/21 (100%)	92%

Table 7.8 shows a comparison of the OR and ANN results, depicting similar results for the full models of both methods.

Table 7.8: Prediction Accuracy Summary: OR vs. ANN

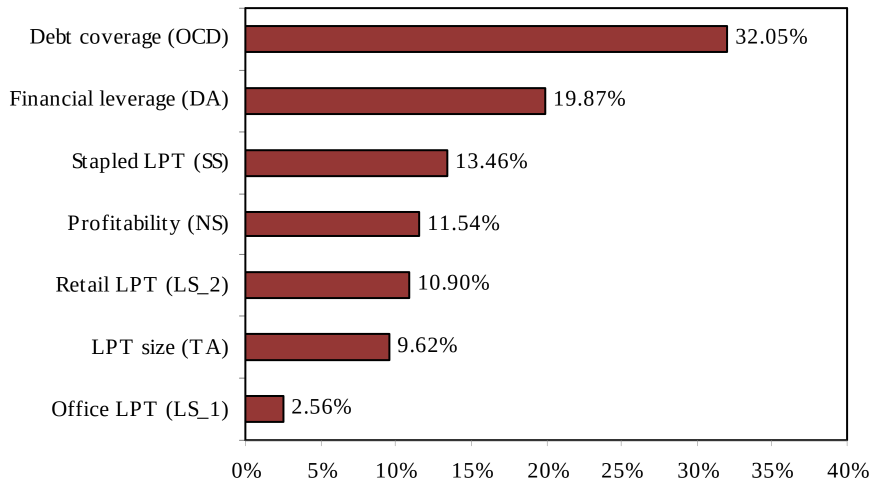
	OR	**ANN**
Model 1	56%	83%
Model 2	60%	86%
Model 3	72%	88%
Model 4	91%	91%
Model 5	91%	92%

7.4.2.2 Variable Contribution Analysis

Earlier literature and publications by credit rating agencies state that financial variables are important in the credit rating of firms and unsecured bonds issued by firms, to the best of our knowledge no study has empirically examined the relative contribution of both financial and industry-based variables in LPT bond rating. This study thus evaluates the relative importance of different factors considered in the LPT bond rating using a neural network model.

The results of the relative importance of these variables in our full neural network model (model 5) are shown in Figure 7.2. In order to maintain brevity, results of the other two models are not shown but suffice to state that the following order of importance was revealed though at various percentages: OCD, DA, SS, NS, LS_2, TA and LS_1.

Figure 7.2: LPT Bond Rating Variable Contribution



This has study has shown that 27.0% of LPT bond rating is attributable to industry-based variables; office LPT sector accounting for 2.6%, retail LPT 10.9% and stapled management structure 13.5%. Unlike Gray et al. (2006) who found industry-based variables insignificant in rating Australian firms using probit regression, results of OR and ANN analysis in this study indicate that industry-based variables are important in determining LPT bond ratings. A possible explanation is that LPTs core business is property investment. Financial variables contribute 73.0% to LPT bond rating, with debt coverage (OCD) being the dominant variable at 32.0%. This is followed by financial leverage (DA: 19.9%), profitability (NS: 11.5%) and LPT size (TA: 9.6%).

One drawback observable from Figure 7.2 is that no signs are attached to the calculated weights. Thus the interpretation of the relative weights must be inferred from OR analysis.

7.5 SUMMARY

This chapter examines the impact of financial and industry variables on LPT bond ratings issued by Standard and Poor's from 1999 - 2006. OR results show that the financial variables used in our models, debt coverage (OCD) and financial leverage ratios (DA) have the most profound effect on LPT bond ratings. Furthermore, industry-based variables of LPT sector (Office: LS_1 and Retail: LS_2) and stapled management structure (SS) significantly affect bond rating.

Predictive accuracies of OR and ANN as alternative quantitative methods to rating LPT bonds are also examined. Empirical analyses indicate that both OR and ANN provide robust alternatives to rating LPT bond and that there are no significant differences in results between their two full models. Across all the models, ANN had better results than OR. Inclusion of industry-based variables increases the predictive accuracies of both OR and ANN models. In addition, ANN results show that 73% of LPT bond rating is attributable to financial variables and 27% to industry-based variables.

However, before these results and those of chapter six can be generalised, field studies need to be conducted to compare the interpretation of the bond-rating process obtained from models in this study with those of CMBS issuers and arrangers. Deeper market structure analysis is also needed to fully explain the differences found in the models in this study. These matters are covered in the next chapter.

CHAPTER 8

QUALITATIVE ANALYSIS OF AUSTRALIAN CMBS CREDIT RATINGS

8.1 BACKGROUND

The previous two chapters provided evidence of the limitations of traditional statistical techniques and the potential for unstructured analytical techniques, such as ANNs, in the credit rating of Australian CMBSs and LPT bonds. With the importance of subjective judgement in the bond rating process as propagated by credit rating agencies and researchers acknowledged, this chapter looks at the credit rating of CMBSs using qualitative techniques.

In particular, mailed questionnaire surveys of issuers and arrangers of Australian CMBSs are undertaken in order to better understand the structuring issues they consider necessary to obtain a high credit rating and pricing issues necessary for the success of an issue. Appendix B shows sample questionnaires administered on the two respondent groups. Furthermore, results of the surveys are analysed to compare whether there are any differences between the two groups. This is important for the identification of principal-agent problems, if any.

8.2 DISTILLATION OF FACTORS CONSIDERED IN STRUCTURING CMBSs

8.2.1 Structuring Details

(i) Debt funding options

CMBs are one of the many available debt funding options as discussed in Chapter two. Arrangers and issuers are asked to rank the importance of CMBSs as a debt funding tool. This forms a basis for deducing motivating factors behind its use as a funding tool and also impacts on the growth of the CMBS market.

(ii) Credit enhancement techniques used

As earlier pointed out in chapter three, credit enhancement is undertaken to act as a "ring-fence" around assets to avoid insolvency and also results in a higher rating of the bonds issued. Therefore, questions are posed on the various credit enhancement techniques that are used in order to answer questions like, "Do CMBSs backed by certain property classes require specific credit enhancement techniques or are the techniques generic? What is the impact of using different credit enhancement techniques on the rating?"

(iii) Preferred tranching and size of tranches

Certain institutional investors, such as superannuation funds, are only mandated to undertake "investment-grade" rated investments (Newell 2006b). Although majority of the tranches in Australian CMBSs issued are AAA-class rated, BBB to B-class tranches are becoming common. This shows the growth/maturing of the market, increased acceptance of the investment asset and the increased participation of more knowledgeable investors (Chikolwa 2007a). Therefore, questions on the preferred tranching and their sizes are important to understanding the growth of the CMBS market.

(iv) Structuring costs and duration

Han (1996) points out that for a CMBS transaction to be commercially viable in the US, issues have to be US$50 million and above to cover the high structuring costs. Henderson and ING Barings (1997) and (Ooi et al. 2003) reinforce Han's assertion that the major drawback with CMBS issuance are the high structuring costs. As such, we seek to establish average structuring costs for Australian CMBSs that make CMBSs a viable debt funding tool.

(v) Pricing details

Market yields correspond to bond ratings, which indicate an association between rating and risk. The higher the credit quality the lower will be yield and the more successful will be the issue (Alles 2000; Kose et al. 2003). Arrangers and issuers are asked how they price their issues to ensure their success.

8.2.2 Motivating Factors behind CMBS Issuance

According to Henderson & ING Barings (1997) factors that support securitization are:

- Funds can be provided at attractive rates
- Provision of an alternative source of funding
- Ability to tap large sources of funds
- Provision of matched funding for medium term and long-term receivables
- An improved company's return on capital

Therefore, we seek to find out which of these factors are considered beneficial for CMBS by arrangers and issuers.

8.2.3 Factors Attractive for Investors to Invest in CMBS

Sing et al. (2004b) in their study on the development of CMBS market in Singapore asked respondents on the following factors which investors find attractive to invest in CMBS:

- Rating of issues
- Market liquidity
- Term to maturity
- Credit enhancement / guarantee
- Denomination of tranche
- Information efficiency
- Correlation with other assets
- Issuing agents and underwriting banks

A similar approach is followed in our study to investigate factors which investors find attractive to invest in Australian CMBSs.

8.2.4 Factors Considered to Obtain a High Credit Rating

The following factors have been identified as being important for obtaining a high CMBS credit rating (Fitch Ratings 2005c; Moody's Investor Service 2003; Roche 2002; Standard & Poor's 2001):

- Asset quality: Location; Age; Condition; Tenant retention rate.

- Tenant / Lease details: Credit quality of income; Tenancy concentration; Lease expiry profile.
- Portfolio composition: Total number of assets; Diversification (property concentration, type, and geographic location).
- Financials and other details: Refinancing risk; Transaction support mechanisms / credit enhancement; gearing (DSCR and LTV ratio).
- Management: Quality and experience; Growth strategy.

As pointed out in chapter four and five, secondary risk factors such as legal risk and third party risk, are not considered as common structural mechanisms to mitigate them have been set up for all CMBSs. Therefore, issuers and arrangers are asked to rank the importance of factors considered necessary to obtain a high credit rating.

8.3 SURVEY METHODOLOGY

The sample of CMBS issuers and arrangers selected for this study is taken from various Standard and Poor's CMBS presale reports issued over the study period, 2000 - 2006. Due to the small population, invitation letters were sent out to twelve CMBS issuers and eight CMBS arrangers in August 2007 and January 2008, respectively. The first survey (August 2007) was done at the infancy of the "credit crunch crisis" and the second (January 2008) when its effects were being fully felt in the Australian capital markets. The difference in the state of the market between the two survey periods may influence the survey results.

While the number of respondents in these surveys is small, they represent a significant coverage of the market. The author checked the contact details of each survey participant to ensure the invitation letter would be mailed to the correct person in the corporation.

In compliance with the Curtin University of Technology human research ethics protocol, the identity of the respondents and interviewees will not be disclosed and the survey and interview results will be presented in an aggregated format. A copy of the invitation letter and the survey questionnaires are attached in Appendix 1.

8.3.1 Description of Respondents - Issuers

For the period 2000 - 2006, a total of fifteen CMBS issuers were identified. Of the fifteen identified issuers, twelve were selected for survey after establishing a target respondent. The identified respondents were fund managers in CMBS issuer firms. The twelve presented a market share of 93%, with a combined CMBS issuance of AU$16.3 billion. In the remaining three CMBS issuer firms, no clear respondent could be identified as the issuing decisions where spread in various departments and attempts to identify a respondent were not responded to.

The surveys were posted out during the month of August 2007 and responses were received in the following month. A total of five responded, giving a response rate of 42%. The five respondents had issued a combined total of AU$5.1 billion worth of CMBSs or 29% of total issuance from 1999 to December 2006.

8.3.2 Description of Respondents - Arrangers

During the same study period, a total of eight CMBS arrangers where identified, representing 100% market share. CMBS arrangers are international investment banks and the investment banking wings of major Australian banks, with target respondents in this group being investment bankers. They had arranged a combined CMBS issuance of AU$17.4 billion from 1999 to December 2006. A total of three responded, giving a response rate of 37.5%. The three respondents had arranged a combined total of AU$12.4 billion worth of CMBSs or 71% of total issuance from 1999 to December 2006.

8.3.4 Methods of Analysing Responses

8.3.4.1 Likert Scale

A 5-point Likert scale is applied in the questionnaire to determine the importance of a factor with score 1 = Not Applicable, 2 = Not Important, 3 = Important, 4 = Very Important, and 5 = Essential. Arithmetic means of the Likert scale scores were done to determine the ranking in importance attributed to various factors in rating and investing in CMBSs, and in obtaining a high CMBS credit rating. Further, the percentage attributable to the 'very important' and 'essential' categories in the responses was determined as a percentage of the overall factor score.

8.3.4.2 Analysis of Variance (ANOVA)

Analysis of variance was applied to determine whether there is a statistically significant difference between CMBS issuer and arranger responses. The analysis considered the weight of the responses to motivating factors behind CMBS issuance, potential factors attracting investment in CMBS, and factors considered necessary to obtain a high CMBS credit rating. There were a total of eighteen factors, and consequently eighteen ANOVAs to be performed. The results from the ANOVA would explore the significant differences, if any, between the issuer and arranger groups.

One-way ANOVA tests were applied for each of the factors for both the issuer and arranger groups. The ANOVA tests were performed using Excel. If the F statistic from any of the eighteen tests be greater than the critical value of the respective test ($P<5\%$), then the groups in that factor category are significant. Alternatively, there is no statistically significant difference between the two respondent groups (Steel et al. 1997).

8.3.4.3 Spearman's Rank Correlation

The ranking of responses of factors from each of the issuers and arranger groups were analysed to test the overall degree of association between the ranks using Spearman's rank-correlation test (Croucher 1997; Kohler 1993).

The formula for calculating the value of r_s, the rank correlation co-efficient, is expressed by the equation:

$$\mathbf{r_s} = 1 - \frac{6\sum \mathbf{d_i}}{\mathbf{n^3 - n}}$$

where:

d_i = the difference between the corresponding rankings, and

n = the number of pairs of observations.

8.4 RESULTS AND DISCUSSION

8.4.1 Issuers

The first questions asked were on their level of participation in the CMBS market and on satisfaction with CMBSs as a funding source. Of the five respondents, three expressed satisfaction with utilising CMBS as a funding source, one was neutral and one was dissatisfied. The respondents who expressed satisfaction with CMBS as a funding source indicated that they had intentions of issuing a combined total of AU$3.5 billion over the next 3 - 5 years.

Responses to the other questions are discussed below.

8.4.1.1 Structuring Details

(i) Debt funding options used

Of the available debt funding options of commercial paper, bank debt, medium term notes and CMBS, the four respondents who answered this question were divided in preference with 50% for CMBS and 50% for bank debt. The strong preference for bank debt funding is indicative of the increased bank lending to the commercial property sector (Reserve Bank of Australia 2006).

(ii) Credit enhancement techniques used

Of the available credit enhancement techniques, 80% of the respondents regard credit tranching as their main method, with the remaining 20% opting for over-collateralisation. The second most preferred methods of credit enhancement were cross-collateralisation (80%), reserve funds (20%), and credit tranching (20%). The least preferred of the methods used were related party guarantees. Other techniques such as spread accounts, monocline and multiline insurance, letters of credit, and amortisation triggers were not used by the respondents.

(iii) Preferred tranching and size of tranches

Over 80% of the respondents preferred issuing four or more tranches (Aaa/AAA, Aa/AA, A/A, Baa/BBB, Ba/BB), with the remaining 20% preferring only three tranches (Aaa/AAA, Aa/AA, A/A). This shows the depth of the market and how confident the issuers were that even the lower rated issues would be taken up. A probable reason for having only AAA, AA, and A rated tranches could be the desire to target wholesale investors with mandates to invest only in investment grade issues.

Only one (20%) of the respondents preferred issuing tranche size of over AU$200 million for AAA-rated notes. The most preferred tranche size (80%) was AU$51 - AU$200 million. The ideal subordination levels for this tranche were reported as 80% - 85%. The preference for larger transaction size is supported by Han’s (1996) supposition that financing costs drop with increase in transaction size.

(iv) Structuring costs and duration

The duration of structuring CMBSs ranged from 4 - 9 months and average all-in structuring costs, excluding margins, ranged between 0.21% - 0.5%. No costs were ascribed to first loss cover or credit enhancement.

(v) CMBS refinancing options

The refinancing options considered when the CMBSs mature were further capital market issues and bank debt. Nearly 80% of the respondents regard further capital market issues as their first preference to CMBS refinancing and only 20% prefer bank debt. The reason advanced for bank debt was that it was cheaper, deeper and easier to arrange.

(vi) Pricing details

The recent credit squeeze has meant that pricing margins for CMBS are at their highest level and pricing of new issues is almost non-existent. Margins of 21 - 25 basis points (bp) were considered ideal by 80% of the respondents for both 3 year and 5 year AAA rated CMBS issues. The remaining 20% considered margins of 10 – 20 bp as being ideal.

As for BBB rated CMBS issues, the range for 3 year issues was 51 – 80 bp and for 5 year issues 81 – 80 bp.

8.4.1.2 Motivating Factors behind CMBS Issuance

A list of potential motivating factors behind issuance of CMBSs was presented to the respondents and the relative importance of each factor was ranked (Table 8.1). The most important factor, from the view of the respondents, is provision of funds at attractive rates. The other factors considered important are provision of an alternative source of funding and ability to tap large sources of funds. The respondents found factors such as improving the company’s return on capital and provision of matched funding of medium and long-term receivables as not important considerations behind the decision to issue CMBSs.

Table 8.1: Potential Motivating Factors behind CMBS Issuance - Issuers

Potential Motivating Factor	Average Score	% ‘very important / essential’
Funds can be provided at attractive rates	3.8	80%
Provision of an alternative source of funding	3.6	80%
Ability to tap large sources of funds	3.4	80%
Provision of matched funding for medium term and long-term receivables	2.0	20%
An improved company’s return on capital	1.4	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = important, 4 = Very Important, 5 = Essential

8.4.1.3 Factors Attractive for Investors to Invest in CMBS

Over 80% of the respondents regard rating of CMBS issues as being the most important attraction factor for investors to invest in CMBSs. The other important considerations identified by 40% of the respondents are market liquidity, term to maturity, and information efficiency. The remaining factors of credit enhancement, denomination of tranche and the involvement of agents and underwriting banks were considered unimportant factors to attracting investors in CMBSs.

Table 8.2 presents a list of potential factors which investors find attractive for investing in CMBSs.

Table 8.2: Factors Attractive for Investors to Invest in CMBS - Issuers

Attracting Factor	**Average Score**	**% 'very important / essential'**
Rating of issues	4.0	80%
Market liquidity	3.4	40%
Term to maturity	3.2	40%
Credit enhancement / guarantee	3.0	20%
Denomination of tranche	3.0	20%
Information efficiency	3.0	40%
Correlation with other assets	2.4	0%
Issuing agents and underwriting banks	2.0	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = important, 4 = Very Important, 5 = Essential

These results are similar to those found by Sing et al. (2004b) in their study on the development of the CMBS market in Singapore. They listed rating of issues and market liquidity as the two most important factors, followed by term to maturity and credit enhancement.

8.4.1.4 Factors Considered to Obtain a High Credit Rating

Majority of the respondents regard asset quality (80%) and tenant / lease details (80%) as the two most important factors needed to obtain a high credit rating. This finding is consistent with criteria set by the rating agencies for CMBS credit rating (Moody's Investor Service 2003; Standard & Poor's 2003c, 2005b) and other researchers (Roche 2002). However, less than 20% of the respondents consider management, financials and transaction support details as being important considerations to obtain a high credit rating. A probable reason for the low consideration of management is that most of the issuers are highly successful in running their LPTs and it is this same expertise that is being used in managing their CMBS issuances with no extra requirements needed. As for financials and transaction support details, there are minimum benchmarks to be met for a CMBS to be rated.

Table 8.3 presents a list of potential factors considered necessary to obtain a high CMBSs credit rating.

Table 8.3: Factors Considered to Obtain a High Credit Rating - Issuers

Potential Factors Considered	**Average Score**	**% 'very important / essential'**
Asset quality: Location; Age; Condition; Tenant retention rate	3.7	80%
Tenant / Lease details: Credit Quality of income; Tenancy concentration; Lease expiry profile	3.6	80%
Portfolio composition: Total number of assets; Diversification (asset, geographic, sector)	3.2	40%
Financials and other details: refinancing risk; Transaction support mechanisms / credit enhancement; gearing (DSCR and LTV ratio)	3.0	20%
Management: Quality and experience; Growth strategy	2.8	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = important, 4 = Very Important, 5 = Essential

8.4.2 Arrangers

All the respondents expressed satisfaction in their past experience with the use of CMBSs as a funding tool. However, due to the current credit squeeze resulting from the US sub-prime mortgage market crisis, they were all unsure of their future participation in CMBS structuring until market conditions normalised.

Responses to the other questions are discussed below.

8.4.2.1 Structuring Details

(i) Debt funding options used

Mixed results were obtained for the most preferred debt funding option with two of the respondents opting for bank debt and the remainder choosing CMBS. Again, no established pattern could be obtained for the least preferred option with each of the respondents choosing commercial paper, medium term notes and CMBS.

(ii) Credit enhancement techniques used

Credit tranching was considered as main credit enhancement technique by all the respondents. They considered over-collateralisation, cross-collateralisation, amortisation triggers and reserve funds as second tier credit enhancement techniques. Other techniques such as spread accounts, monocline and multiline insurance, and letters of credit were not used by the respondents.

(iii) Preferred tranching and size of tranches

All the respondents indicated that only tranching from AAA to BBB was viable to attract investors and that only tranche sizes of AU$100 million and above were cost effective. The ideal subordination levels for AAA notes were reported as ranging from 60% - 85%, different from the first group.

(iv) Structuring costs and duration

The duration of structuring CMBSs ranged from 4 - 6 months, with several activities running in tandem such as compiling documentation and the rating process. The average all-in-all structuring costs, excluding margins, ranged between 0.1% - 1%. First loss cover or credit enhancement costs were said to depend on the deal or were taken into account in the tranching process.

(v) CMBS refinancing options

Two of the respondents stated further capital market debt issues as their preferred refinancing option when the CMBSs matured and one preferred refinancing using bank debt. The least considered refinancing option by all respondents was asset sales.

(vi) Pricing details

One of the respondents indicated that pricing of CMBSs depended on characteristics of the underlying collateral, with another stating that historical ranges for AAA notes were 20 - 40 basis points (bp) and 150 – 300 bp for BBB notes. All the respondents were in unison that under current market conditions, pricing of AAA notes could range between 60 – 80 bp and BBB notes between 200 – 300 bp and that these could even be high as the CMBS market had literally shutdown.

8.4.2.2 Motivating Factors behind CMBS Issuance

A list of potential motivating factors behind issuance of CMBSs was presented to the respondents and the relative importance of each factor was ranked (Table 8.4). The most important factors, from the view of the respondents, are provision of funds at attractive rates and ability to tap large sources of funds. The other factors considered important are provision of an alternative source of funding and improvement of the company's return on capital. The respondents found the provision of matched funding of medium and long-term receivables as an unimportant consideration in CMBS issuance.

Table 8.4: Potential Motivating Factors behind CMBS Issuance - Arrangers

Potential Motivating Factor	Average Score	% 'very important / essential'
Funds can be provided at attractive rates	5.0	100%
Ability to tap large sources of funds	4.0	100%
An improved company's return on capital	3.6	68%
Provision of an alternative source of funding	3.3	33%
Provision of matched funding for medium term and long-term receivables	2.6	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = Important, 4 = Very Important, 5 = Essential

8.4.2.3 Factors Attractive for Investors to Invest in CMBS

All of the respondents regard rating of CMBS issues as being the most important attraction factor for investors to invest in CMBSs, with term to maturity and market liquidity considered as the second and third most important factors respectively. The other factors considered by the respondents are information efficiency, credit enhancement and denomination of tranche. The involvement of agents and underwriting banks was considered an unimportant factor to attracting investors in CMBSs.

Table 8.5 presents a list of potential factors which investors find attractive for investing in CMBSs.

Table 8.5: Factors Attractive for Investors to Invest in CMBS - Arrangers

Attracting Factor	Average Score	% 'very important / essential'
Rating of issues	5.0	100%
Term to maturity	4.0	100%
Market liquidity	4.0	68%
Credit enhancement / guarantee	3.6	68%
Denomination of tranche	3.6	33%
Information efficiency	3.6	33%
Correlation with other assets	3.0	33%
Issuing agents and underwriting banks	2.3	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = important, 4 = Very Important, 5 = Essential

8.4.2.4 Factors Considered to Obtain a High Credit Rating

Two of the respondents regard financials and transaction support details as being the most important factors needed to obtain a high credit rating, with portfolio composition coming in second. Asset quality and tenant / lease details come in third, with the least important factor being management.

Table 8.6 presents a list of potential factors considered necessary to obtain a high CMBSs credit rating.

Table 8.6: Factors Considered to Obtain a High Credit Rating - Arrangers

Potential Factors Considered	Average Score	% 'very important / essential'
Financials and other details: Refinancing risk; Transaction support mechanisms / credit enhancement; Gearing (DSCR and LTV ratio)	4.6	100%
Portfolio composition: Total number of assets; Diversification (asset, geographic, sector)	4.3	100%
Asset quality: Location; Age; Condition; Tenant retention rate	4.0	80%
Tenant / Lease details: Credit quality of income; Tenancy concentration; Lease expiry profile	3.7	33%
Management: Quality and experience; Growth strategy	3.0	0%

Note: Score 1 = N/A, 2 = Not Important, 3 = important, 4 = Very Important, 5 = Essential

8.4.3 Comparison of Issuer and Arranger Results

8.4.3.1 Structuring Details

There following comparisons can be made between issuers and arranger perceptions of structuring details in CMBSs:

(i) Debt funding options used

Issuers had an even preference of debt funding options they used at 50% each of further CMBS issuances and bank debt, whereas no preference pattern could be established for arrangers. These results are not surprising with banking lending for commercial property being buoyant. For instance, it increased by 27% over the year to March 2007, with lending to the industrial property market growing by 31% (Reserve Bank of Australia 2007). This is attributable to the strong property performance supported by improving business climate. Prime office property prices rose by 22% over the year to December 2006, the strongest annual growth since December 1988, while industrial property prices rose by 12% over the same period. The NAB Business November 2007 Survey (National Australia Bank 2007) states that business conditions remain at record levels despite financial market turbulence and that though confidence has edged down, it is still at robust levels.

(ii) Credit enhancement techniques used

Both issuers and arrangers considered credit tranching as main credit enhancement technique, followed by over-collateralisation, cross-collateralisation. Amortisation triggers and reserve funds are considered third-tier credit enhancement techniques. Other techniques such as spread accounts, monocline and multiline insurance, and letters of credit were not used by the respondents.

This is in line with standard market practice of common features included in all CMBS issues. These matters were discussed in chapter four.

(iii) Preferred tranching and size of tranches

Both groups of respondents indicated that only tranching from AAA to BBB was viable to attract investors, but had differences in the ideal tranche size; issuers indicted a range of AU$51 - 200 million and arrangers indicated AU$100 million. The results are comparable to the US (Han 1996) and Singapore (Sing et al. 2004b) where US$50 million and S$500.1 million respectively were deemed to be optimal tranche sizes to provide liquidity in the market. The ideal subordination levels for AAA notes were reported as ranging from 60% - 85%.

(iv) Structuring costs and duration

The duration of structuring CMBSs ranged from 4 - 6 months for the arrangers and 4 – 9 months for the issuers, with several activities running in tandem such as compiling documentation and the rating process. Significant differences were noted for the average all-in-all structuring costs (excluding margins), which ranged between 0.1% - 1% for arrangers and issuers at 0.21 – 0.5%. These differences attributable to the two groups are not readily explainable.

(v) CMBS refinancing options

Both issuers and arrangers stated further capital market debt issues and refinancing using bank debt as their preferred refinancing option when the CMBSs matured. The least considered refinancing option considered was asset sales.

As explained earlier, bank funding to commercial property market has been favourable and demand for securitised debt securities has been strong, hence making it easier to refinance CMBSs using the two methods.

(vi) Pricing details

The two groups generally were of the view that ideal pricing for AAA notes should start at 20 bp and over 50 bp for BBB notes. Further, the differences in the survey period between issuers (August 2007) and arrangers (January 2008) showed in their interpretation of market conditions. At the time arrangers were surveyed, the CMBS market had literally shutdown due to the effects of the US sub-prime mortgage crisis. They indicated that pricing of AAA notes could range between 60 – 80 bp and BBB notes between 200 – 300 bp under current market conditions.

8.4.3.2 Analysis of Variance

ANOVA (Analysis of Variance) is used to test the differences of perceptions between groups with respect to each of the eighteen factors in Tables 8.4 - 8.6 at 5% level of significance for arrangers and issuers. The results of the analysis are presented in Tables 8.7 - 8.9.

Table 8.7: ANOVA for Factor Responses to Motivations behind CMBS Issuance

PROVISION OF FUNDS AT ATTRACTIVE RATES

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	15	5	0
Issuer	5	19	3.8	1.7

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.7	1	2.7	2.3823529	0.1736585	5.9873776
Within Groups	6.8	6	1.1333333			
Total	9.5	7				

IMPROVED COMPANY'S RETURN ON CAPITAL

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	11	3.6666667	0.3333333
Issuer	5	7	1.4	0.3

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	9.63333	1	9.6333333	30.964286	0.0014268	5.9873776
Within Groups	1.86667	6	0.3111111			
Total	11.5	7				

ALTERNATIVE FUNDING SOURCE

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	10	3.3333333	0.3333333
Issuer	5	18	3.6	0.3

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.13333	1	0.1333333	0.4285714	0.5369633	5.9873776
Within Groups	1.86667	6	0.3111111			
Total	2	7				

ABILITY TO TAP LARGE SOURCES OF FUNDS

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	12	4	0
Issuer	5	17	3.4	0.8

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.675	1	0.675	1.265625	0.3035694	5.9873776
Within Groups	3.2	6	0.5333333			
Total	3.875	7				

PROVISION OF MATCHED FUNDING

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	8	2.6666667	0.3333333
Issuer	5	10	2	1.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.833333	1	0.8333333	0.75	0.4197531	5.9873776
Within Groups	6.666667	6	1.1111111			
Total	7.5	7				

Table 8.8: ANOVA for Factors Investors Find Attractive to Invest in CMBS

CORRELATION WITH OTHER ASSETS

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	9	3	1
Issuer	5	12	2.4	0.3

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.675	1	0.675	1.265625	0.3035694	5.9873776
Within Groups	3.2	6	0.5333333			
Total	3.875	7				

ISSUING AGENTS AND UNDERWRITING BANKS

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	7	2.3333333	0.3333333
Issuer	5	10	2	0.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.2083333	1	0.2083333	0.46875	0.5191201	5.9873776
Within Groups	2.6666667	6	0.4444444			
Total	2.875	7				

DENOMINATION OF TRANCHE

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	11	3.6666667	1.3333333
Issuer	5	15	3	0.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.8333333	1	0.8333333	1.0714286	0.3405278	5.9873776
Within Groups	4.6666667	6	0.7777778			
Total	5.5	7				

INFORMATION EFFICIENCY

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	11	3.6666667	1.3333333
Issuer	5	15	3	1

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.8333333	1	0.8333333	0.75	0.4197531	5.9873776
Within Groups	6.6666667	6	1.1111111			
Total	7.5	7				

MARKET LIQUIDITY

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	12	4	1
Issuer	5	17	3.4	1.3

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.675	1	0.675	0.5625	0.4816178	5.9873776
Within Groups	7.2	6	1.2			
Total	7.875	7				

RATING OF ISSUES

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	15	5	0
Issuer	6	25	4.1666667	1.3666667

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.3888889	1	1.3888889	1.4227642	0.2718071	5.5914478
Within Groups	6.8333333	7	0.9761905			
Total	8.2222222	8				

CREDIT ENHANCEMENT

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	11	3.6666667	2.3333333
Issuer	5	15	3	0.5

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.8333333	1	0.8333333	0.75	0.4197531	5.9873776
Within Groups	6.6666667	6	1.1111111			
Total	7.5	7				

TERM TO MATURITY

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	12	4	0
Issuer	5	16	3.2	0.7

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.2	1	1.2	2.5714286	0.1599305	5.9873776
Within Groups	2.8	6	0.4666667			
Total	4	7				

Table 8.9: ANOVA for Factors Considered to Obtain a High Credit Rating

ASSET QUALITY

SUMMARY

Groups	Count	Sum	Average	Variance
Issuer	3	11	3.6666667	1.3333333
Arranger	5	20	4	1.5

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.2083333	1	0.2083333	0.1442308	0.7171899	5.9873776
Within Groups	8.6666667	6	1.4444444			
Total	8.875	7				

TENANT/LEASE DETAILS

SUMMARY

Groups	Count	Sum	Average	Variance
Arranger	3	11	3.6666667	1.3333333
Issuer	5	18	3.6	1.3

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0083333	1	0.0083333	0.0063559	0.9390493	5.9873776
Within Groups	7.8666667	6	1.3111111			
Total	7.875	7				

PORTFOLIO COMPOSITION

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	13	4.3333333	0.3333333
Issuer	5	16	3.2	0.7

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.4083333	1	2.4083333	4.1682692	0.0872468	5.9873776
Within Groups	3.4666667	6	0.5777778			
Total	5.875	7				

MANAGEMENT

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	9	3	0
Issuer	5	14	2.8	0.2

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.075	1	0.075	0.5625	0.4816178	5.9873776
Within Groups	0.8	6	0.1333333			
Total	0.875	7				

FINANCIALS AND OTHER DETAILS

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Arranger	3	14	4.6666667	0.3333333
Issuer	5	15	3	0.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.2083333	1	5.2083333	11.71875	0.0140871	5.9873776
Within Groups	2.6666667	6	0.4444444			
Total	7.875	7				

8.4.3.3 Analysis of Significant Differences between Arrangers and Issuers

Table 8.10 identifies those factors where significant differences between the two respondent groups existed. These were:

- Improved company's return on capital, for motivating factors behind CMBS issuance; and
- Financials and other details, for factors needed to obtain a high credit rating.

The differences indicate a perception by the one group of greater relevance of these factors. The issuer group found improved company's return on capital to be the least important of all the factors motivating CMBS issuance, unlike the arranger group who considered it more favourably.

For financials and other details, the arranger group ranked these more than the arranger group in terms of relevance in obtaining a high CMBS credit rating.

One possible explanation for these differences is that arrangers consider a stable or solid financial standing of a company issuing CMBSs and its ability to meet its debt obligations to be critical in credit rating. This view can be reinforced by the recent "credit crunch" induced problems in the capital markets, meaning that only companies with more stable financial standings are able to issue debt securities.

Table 8.10: Descriptive Statistics of Perceptions of All Respondents

	Group Average Factor Score		
	Arranger	Issuer	Significance
Motivations Behind CMBS Issuance			
Provision of funds at attractive rates	5.0	3.8	ns
Improved company's return on capital	3.6	1.4	*
Alternative funding source	3.3	3.6	ns
Ability to tap large sources of funds	4.0	3.4	ns
Provision of matched funding	2.6	2.0	ns
Factors Investors Find Attractive to Invest in CMBS			
Rating of issues	5.0	4.0	ns
Term to maturity	4.0	3.2	ns
Market liquidity	4.0	3.4	ns
Credit enhancement / guarantee	3.6	3.0	ns
Denomination of tranche	3.6	3.0	ns
Information efficiency	3.6	3.0	ns
Correlation with other assets	3.0	2.4	ns
Issuing agents and underwriting banks	2.3	2.0	ns
Factors Considered to Obtain a High Credit Rating			
Financials and other details	4.6	3.0	*
Portfolio composition	4.3	3.2	ns
Asset quality	4.0	3.7	ns
Tenant\Lease details	3.7	3.6	ns
Management	3.0	2.8	ns

* = significantly different (P < 5%)

ns = not significantly different

8.4.4 Ranking Average Factor Scores between Arrangers and Issuers

Table 8.11 shows average factor scores and their ranking of the two respondent groups. Also shown are the overall average factor scores and their ranking. The average factor scores are arithmetic averages of all the eight respondents.

The Spearman's rank correlation co-efficients were determined for the factor scores of arrangers and issuers. These were:

- Motivations Behind CMBS Issuance: $r_s = 0.50$
- Factors Investors Find Attractive to Invest in CMBS: $r_s = 0.97$
- Factors Considered to Obtain a High Credit Rating: $r_s = 0.45$

The results indicate that there is a strong relationship between arrangers' and issuers' ranking of the factors.

The rankings for each of the factors assessed in Table 8.11 are discussed below:

(i) Motivations Behind CMBS Issuance

Both arrangers and issuers ranked provision of funds at attractive rates to be the most important factor behind CMBS issue with an overall factor score of 4.3. There were differences in perception of importance for the remaining factors. However, the overall factor average scores for provision of an alternative funding source and ability to tap large sources of funds were ranked second and third respectively. Their average factor scores are 3.5 and 3.1. The fourth ranked factor was provision of matched funding and the least was improvement of company's return on capital, with average factor scores at 2.8 and 2.3 respectively.

(ii) Factors Investors Find Attractive to Invest in CMBS

Rating of issues was considered the most important factor attracting investors to invest in CMBS by both arrangers and issuers, with an overall factor score of 4.4. Other factors ranked highly in order of importance are market liquidity, term to maturity, information efficiency, credit enhancement/guarantee and denomination of tranche, with average factor scores ranging from 3.5 – 3.0. Correlation with other assets and involvement of issuing agents and underwriting banks were considered the least important, average factor scores at 2.6 and 2.1 respectively (Table 8.11).

(iii) *Factors Considered to Obtain a High CMBS Rating*

Average factor score rankings for arrangers and issuers were divergent with financials and other details, and asset quality ranked as the most important factors respectively. The reason for this divergent view was earlier discussed in Section 8.4.3.3. A similar scenario prevailed for the remaining factors except for management which all parties considered the least important.

However, on an overall basis asset quality prevailed as the most important factor at a score of 3.9. Financial details and other details, portfolio composition and tenant\lease details, all had the same score at 3.6. The least was management with a factor score of 2.9.

Overall results of our study are different from those presented by Roche (2002) for ranking CMBSs in the ABN AMRO model. In their model, property-based factors added up to 75% (asset quality (15%); refinancing risk (20%); lease expiry profile (15%); credit quality of income (15%); and tenancy concentration (10%)), management (10%), and portfolio composition (15%). On a percentage basis, their order of importance can be ranked as (1) tenant\lease details, (2) financials and other details, (3) asset quality, (3) portfolio composition, and (4) management.

Table 8.11: Arranger, Issuer and Overall Average Factor Scores

	Arranger Factor Score	Arranger Rank	Issuer Factor Score	Issuer Rank	Overall Factor Score	Overall Rank
Motivations Behind CMBS Issuance						
Provision of funds at attractive rates	5.0	1	3.8	1	4.3	1
Improved company's return on capital	3.6	3	1.4	5	2.3	5
Alternative funding source	3.3	4	3.6	2	3.5	2
Ability to tap large sources of funds	4.0	2	3.4	3	3.1	3
Provision of matched funding	2.6	5	2.0	4	2.8	4
Factors Investors Find Attractive to Invest in CMBS						
Rating of issues	5.0	1	4.0	1	4.4	1
Term to maturity	4.0	2	3.2	3	3.5	3
Market liquidity	4.0	2	3.4	2	3.6	2
Credit enhancement / guarantee	3.6	3	3.0	4	3.3	5
Denomination of tranche	3.6	3	3.0	4	3.0	6
Information efficiency	3.6	3	3.0	4	3.4	4
Correlation with other assets	3.0	4	2.4	5	2.6	7
Issuing agents and underwriting banks	2.3	5	2.0	6	2.1	8
Factors Considered to Obtain a High Credit Rating						
Financials and other details	4.6	1	3.0	4	3.6	2
Portfolio composition	4.3	2	3.2	3	3.6	2
Asset quality	4.0	3	3.7	1	3.9	1
Tenant\Lease details	3.7	4	3.6	2	3.6	2
Management	3.0	5	2.8	5	2.9	3

8.5 SUMMARY

The survey of arrangers and issuers has provided insights into structuring issues they consider necessary to obtain a high credit rating and pricing issues necessary for the success of an issue. While the number of respondents in these surveys is small, they represent a significant coverage of the market. Furthermore, the first survey (August 2007) was done at the infancy of the "credit crunch crisis" and the second (January 2008) when its effects were being fully felt in the Australian capital markets. The difference in the state of the market between the two survey periods may influence the survey results.

Rating of issues was found to be the main reason why investors invest in CMBSs and provision of funds at attractive rates as the main motivation behind CMBS issuance. Furthermore, asset quality was found to be the most important factor necessary to obtain a high credit rating.

CHAPTER 9

CONCLUSION

This chapter summarises the conclusions and property investment and finance implications made in the previous chapters. Summaries of the contributions of this thesis, limitations and future research are also presented.

9.1 SUMMARY OF CONCLUSIONS AND PROPERTY MARKET IMPLICATIONS

In Australia, the description of Commercial Mortgage-Backed Securities (CMBS) has been expanded and accepted in the market to include a form of securitisation backed by direct property assets (Jones Lang LaSalle 2001), in addition to the traditional definition of the securitisation of commercial mortgages (Jacob & Fabozzi 2003). The Australian CMBS market has grown into a major commercial debt funding/investment instrument from when they were first introduced in 1999.

Since Australian CMBSs are primarily backed by direct property assets, their credit risk assessment mainly involves property risk assessment. According to Henderson and ING Barings (1997), assets backing a securitisation are its fundamental credit strength. Moody's Investor Service (2003) reinforce this view by stating that the assigned rating is the relative risk of the collateral and its ability to generate income.

Ultimately, the goal of structuring CMBS transactions is to obtain a high credit rating as this has an impact on the yield obtainable and the success of the issue. Credit rating agencies claim that their ratings reflect each agency's opinion about an issue's potential default risk and rely heavily on a committee's analysis of the issuer's ability and willingness to repay its debt and therefore researchers would not be able to replicate their ratings quantitatively. However, researchers have replicated bond ratings on the premise that financial ratios contain a large amount of information about a company's credit risk. In this study, artificial neural networks (ANN) and ordinal regression (OR) are used as alternative methods to predict CMBS credit ratings.

As such, this thesis examines issues relating to the development of Australian CMBSs and quantitatively and qualitatively analyses the structuring of the Australian CMBSs.

Extensive analysis and discussion of these issues was presented in detail in Chapters 3 to 8. Summary conclusions and property investment and financing implications for each of these issues are presented in the following sub-sections.

9.1.1 Development of the Australian CMBS Market

The Australian CMBS market is well matured in comparison with the much bigger US and EU CMBS markets as seen by the diversity of asset classes backing the issues and transaction types, tightening spreads, and record issuance volumes. High property market transparency (Jones Lang LaSalle 2006b) and predominance of Listed Property Trusts (LPT) as CMBS issuers (Standard & Poor's 2005b), who legally have to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity partners, have contributed to the success of the Australian CMBS market. Furthermore, the strong commercial real estate market outlook should support further CMBS issuance, with LPTs continuing their dominance as issuers.

Events in the LPT share market are of importance to the growth and development of the Australian CMBS market, it being one of the main LPT debt funding options. Although the value of LPTs fell by 2.5% a year to December 2007, in line with the recent falls in share prices in Australia and overseas, and the difficulties of several large property companies in recent months, there have been no announcements more recently of severe stresses in the sector (Reserve Bank of Australia 2008).

While the cost of bank lending rates has risen in the past few months, the increase has not been as large as the rise in CMBS spreads. Lenders are clearly reluctant to issue CMBS at current spreads as doing so would be unprofitable. With the bank bill spread itself having increased, the interest rate on a new AAA-rated CMBS would likely have to be over 150 to 200 bps above the cash rate, compared with an average of 25 bps over recent years (Reserve Bank of Australia 2008). Issues of how risk is assessed and reported for adequate pricing of CMBSs are going to be important in reviving this market. These issues are discussed Section 9.1.2.

The sub-prime mortgage market events in the US have resulted in a "credit crunch" in the global financial system due to an increased perception of risk on the part of lenders. This has had an impact on the refinancing prospects for maturing CMBSs and further resulted in no new issuances since the second half of 2007 due to high spreads on securitisable financial receivables and unsecured debt offerings. Over AU$4.6 billion worth of CMBSs are set to mature in 2008 – 2009 (Figure 9.1 and Table 9.1).

Figure 9.1: Maturity Profile of Australian CMBS Between 2000 – 2006

Source: Author's compilation from various Standard and Poor's CMBS presale reports

Table 9.1: Maturity Profile of Australian CMBS Between 2000 - 2006

Year	Rating					Total (AU$m)
	BB	BBB	A	AA	AAA	
2003				56	379	435
2005		97	148	47	734	1,025
2006		77	264	302	2,115	2,758
2007		83	126	176	1,532	1,917
2008		79	88	135	1,868	2,170
2009	23	158	189	141	2,002	2,512
2010		162	104	103	719	1,087
2011		95	141	222	1,730	2,187
2023					150	150
Total (AU$m)	23	750	1,058	1,181	11,078	14,241

Source: Author's compilation from various Standard and Poor's CMBS presale reports

For instance, part of the problems faced by Centro Property Group is a result of their inability to refinance debt[20], which includes CMBSs.

9.1.2 Assessing and Reporting Property Risk in Australian CMBSs

The success of Australian CMBSs can largely be attributed to high property market transparency and well developed securitisation market. These features and the dominance of issuance by LPTs have contributed to greater assessment and reporting of property risk in CMBSs. However, property risk assessment and reporting has to be done in a more systematic and consistent approach as shown by the proposed framework, which is based on Adair and Hutchinson's (2005) delineation of property risk. The dominance of CMBSs issuance by LPTs who legally have to report their activities and underlying collateral performance to regulatory regimes such as Australian Stock Exchange (ASX) / Australian Security and Investment Commission (ASIC) and their equity investors ensures availability of public information on property risk.

Adequate assessment of property risk and its reporting is critical to the success of CMBS issues. The proposed framework shows that assessing and reporting property risk in

[20] Refer to letter by Centro Group to its investors dated 17 December 2007 (http://www.centro.com.au/NR/rdonlyres/C0D34A17-F5F0-4AAE-8663-E7CC8E0FFB46/0/CentroEarningsRevisionandRefinancingUpdate.pdf)

Australian CMBSs, which are primarily backed by direct property assets, under the headings of investment quality risk, covenant strength risk, and depreciation and obsolescence risk can be easily done. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment. Investor's can also use the proposed framework as a primary source of obtaining information about the quality and marketability of various issues and also assess the market risk premium attached to CMBSs.

Further, the debate on adequate risk assessment and its reporting in property investment schemes has received prominence following the collapse of several property development companies such as Westpoint, Australian Capital Reserve and Bridgecorp. In total, around 20,000 investors in these companies are owed approximately AU$900 million. All four companies were mainly involved in residential property development (Reserve Bank of Australia 2007). As a result, the Australian Securities and Investments Commission (ASIC) has taken a number of steps to improve disclosure requirements applying to unlisted and unrated debentures. This follows concerns that retail investors in these debentures did not always fully understand the risks that they were taking. In mid 2007, it is estimated that unlisted and unrated debentures accounted for approximately AU$8 billion of the AU$34 billion in debentures held by retail investors and self-managed superannuation funds. ASIC released new requirements in *Regulatory Guide 69 – Debentures – Improving Disclosure for Retail Investors*[21] in October 2007 setting disclosure benchmarks for, among other things, equity capital, liquidity, related party transactions and credit ratings. *Regulatory Guide 156 – Debentures Advertising*[22] was further released in December 2007 which details several principle-based standards in relation to the advertising of risk involved in investing in debentures.

[21] Refer to: http://www.asic.gov.au/asic/pdflib.nsf/LookupByFileName/rg69.pdf/$file/rg69.pdf
[22] Refer to: http://www.asic.gov.au/asic/pdflib.nsf/LookupByFileName/rg156.pdf/$file/rg156.pdf

9.1.3 Quantitative Analysis of Australian CMBS Credit Ratings

While this study has empirically tested variables propagated by credit rating agencies as being important to CMBS rating and found all but LTV to statistically insignificant using OR, we conclude that statistical approaches used in corporate bond rating studies have limited replication capabilities in CMBS rating and that the endogeneity arguments raise significant questions about LTV and DSCR as convenient, short-cut measures of CMBS default risk. However, ANNs do offer promising predictive results and can be used to facilitate implementation of survey-based CMBS rating systems. This should contribute to making the CMBS rating methodology become more explicit which is advantageous in that both CMBS investors and issuers are provided with greater information and faith in the investment.

ANN results show that 62% of CMBS rating is attributable to LTV (38.2%) and DSCR (23.6%); supporting earlier studies which have listed the two as being the most important variables in CMBS rating. The other variables' contributions are: CMBS issue size 10.1%, CMBS tenure 6.7%, geographical diversity 13.5% and property diversity 7.9% respectively.

The methodology used to obtain the above results is validated when applied to predict LPT bond ratings. Both OR and ANN provide robust alternatives to rating LPT bonds, with no significant differences in results between the two methods. This confirms our conclusion that statistical approaches used in corporate bond rating studies have limited replication capabilities in CMBS credit rating as all variables (apart from LTV) propagated by credit rating agencies as being important to CMBS rating are found to be statistically insignificant using OR.

9.1.4 Qualitative Analysis of Australian CMBS Credit Ratings

The survey of arrangers and issuers has provided insights into structuring issues they consider necessary to obtain a high credit rating and pricing issues necessary for the success of an issue. Rating of issues was found to be the main reason why investors invest in CMBSs and provision of funds at attractive rates as the main motivation behind CMBS issuance. Further, asset quality was found to be the most important factor necessary to obtain a high credit rating supporting the view by Henderson and ING Barings (1997) that assets backing securitisation are its fundamental credit strength.

Furthermore, the following can be deduced from the surveys:

- The choice of which debt funding option to use depends on market conditions.
- Credit tranching, over-collateralisation and cross-collateralisation are the main forms of credit enhancement in use.
- On average, the AAA note tranche needs to be above AU$100 million and have 60 - 85% subordination for a CMBS issue to be economically viable.
- Structuring costs range between 0.1% – 1% of issue size and structuring duration range from 4 – 9 months.
- Preferred refinancing options are further capital market issues and bank debt.
- Pricing CMBSs is greatly influenced by factors in the broader capital markets. For instance, the market has literary shut down as a result of the “credit crunch” caused by the meltdown in the US sub-prime mortgage market.

These findings can be useful to issuers as a guide on the cost of going to the bond market to raise capital, which can be useful in comparing with other sources of funds.

9.2 SUMMARY OF CONTRIBUTIONS OF THE RESEARCH

The main findings and property investment and finance implications of the development and structuring of Australian CMBSs were summarised and presented in the previous section. Following is a list of the major contributions of this thesis (which match the objectives listed in Section 1.2) to the body of knowledge in the area of property investment and finance:

(1) It has bridged the gap between academic researchers and practitioners. To date few studies have been done on Australian CMBSs outside the credit rating agency circles. These studies are predominantly practitioner focused (Jones Lang LaSalle 2001; Richardson 2003; Roche 2000, 2002). O’Sullivan (1998) and Simonovski (2003) are the only academic studies on CMBSs. Roche (2002) present a model used by ABN AMRO to rank Australian CMBSs, whereas other studies all look at CMBS market structures and development. However, none of these studies have looked at property risk assessment within CMBSs and

determinants of CMBS credit ratings. Furthermore, the current study is the most recent on the development of the Australian CMBS market.

(2) Proposing a framework of assessing and reporting property risk in CMBSs which should prove useful to rating agencies, bond issuers and institutional investors. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

(3) ANNs do offer promising predictive results and can be used to facilitate implementation of survey-based CMBS credit rating systems.

(4) The survey of arrangers and issuers has provided insights into structuring issues they consider necessary to obtain a high credit rating and pricing issues necessary for the success of an issue.

Results of this thesis can be used as a modified form of implicit evaluation of CMBS issuers in addition to the explicit evaluation of CMBS issues. In line with Kim (2005), security analysts and investors can use these results as the primary source of obtaining information about the quality and marketability of various CMBS issues and also assess market risk premium attached to CMBSs while investment bankers can use the results to determine commission rates on undertakings

Overall, as well as addressing priority areas in the Australian CMBS market, this thesis research has proposed a new framework of assessing and reporting property risk in CMBSs and empirically tested determinants of CMBS credit ratings that have provided major insights into the validation of CMBS structuring decision-making.

9.3 SUMMARY OF LIMITATIONS AND FUTURE RESEARCH

There are several limitations surrounding this thesis. Although the empirical results of this study cannot be viewed as definitive due to the small sample size but can form a basis for future studies. Over time with more CMBS issuances, a larger sample size will enable analysis of various issues backed by different property classes to check for differences, if any.

The current body of Australian CMBS knowledge is not that expansive as most literature is US based, where the composition and structure of CMBSs is different from that of Australia. US CMBSs are backed by mortgages on commercial properties whereas Australia CMBSs are primarily backed by direct property assets. Therefore, comparison of CMBSs between the two regions is limited mainly to market structure and transaction volumes. Statistical analysis of historical performance data to estimate credit risk of a pool of commercial mortgages is not possible for Australia.

The study could have benefited from in-depth discussions of our results with those of credit rating agencies but this was not possible due to confidentiality issues.

Another area that future researchers could explore is the use of Multiple Criteria Decision Methods (MDCM), in particular Saaty's (1994; 1996; 2001) Analytic Hierarchy Process (AHP) to determine the actual weights behind various factors considered in structuring CMBSs. This issue was considered outside the realm of this study.

Future researchers could also investigate the impact that exogenous factors resulting from the broader financial markets, such as the "credit crunch" as a result of the turmoil in US sub-prime mortgage market, have on the pricing of CMBS and on the decision-making process of buyers and sellers of CMBSs.

As such, this thesis on the development and structuring of CMBSs, along with the future research recommended, is expected to contribute significantly to the body of knowledge for CMBS funding and investment decision making. Appendix C gives details of the published refereed journal articles from the research in this thesis to further validate the stature and significance of this thesis.

It is clearly evident that the property research in this thesis can aid in the revitalisation of the Australian CMBS market after the "shut down" caused by the melt-down in the US sub-prime mortgage market and can also be used to set up property-backed CMBSs in emerging countries where the CMBS market is immature or non-existent.

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APPENDIX A: AUSTRALIAN AAA-RATED CMBS (2000 – 2006)

No.	Issue Date	Sec.	Issuer	Rating	Issued Amt (AU$m)	Cpn Type	Cpn(%)/BBSW (bp)	SM Date	DSCR**	LTV**
1	Jul-00	Off.	Macquarie Office Trust	AAA	224	Fixed	NK	Sep-03	2.4	35%
2	Dec-00	Ret.	CBD Retail Infrastructure	AAA	54	Floating	44	Jun-07	3.3	36.8
3	Apr-01	Off.	CPIT 2006 Aurora Bonds	Aaa*	150	Floating	41	Mar-06	2.0	32%
4	Jun-01	Div.	Mirvac Capital Pty Ltd	AAA	150	Fixed	6.50%	Jun-06	2.2	40%
5	Jun-01	Div.	Mirvac Capital Pty Ltd	AAA	350	Floating	41	Jun-06	2.2	40%
6	Sep-01	Ind.	Quay 62 Pty Ltd Series 2001-1	AAA	122	Floating	40	Sep-06	2.2	38%
7	Nov-01	Ind.	Macquarie Goodman	AAA	175	Fixed	5.25%	Nov-06	2.6	39%
8	Nov-01	Ind.	Macquarie Goodman	AAA	135	Floating	43	Nov-06	2.6	39%
9	Nov-01	Off.	Investa Properties Ltd.	AAA	100	Fixed	6.00%	Nov-06	2.4	36%
10	Nov-01	Off.	Investa Properties Ltd.	AAA	150	Floating	43	Nov-06	2.4	36%
11	Feb-02	Off.	ING Office Finance Pty Ltd	AAA	230	Fixed	6.25%	Feb-07	2.4	39%
12	Feb-02	Off.	ING Office Finance Pty Ltd	AAA	178	Floating	40	Feb-07	2.4	39%
13	May-02	Ret.	MCS Capital Pty. Ltd.	AAA	60	Floating	42	May-07	2.8	35%
14	May-02	Ret.	MCS Capital Pty. Ltd.	AAA	104	Floating	42	May-07	2.8	35%
15	Jun-02	Div.	Challenger Capital Markets	AAA	100	Fixed	6.00%	Jun-05	2.7	32%
16	Jul-02	Ind.	ING Industrial Finance	AAA	185	Fixed	5.25%	Jul-07	3.1	33%
17	Jul-02	Ind.	ING Industrial Finance	AAA	85	Floating	43	Jul-07	3.1	33%
18	Jul-02	Div.	Challenger Capital Markets	AAA	120	Floating	40	Jul-05	2.7	32%
19	Sep-02	Off.	Macquarie Office Trust	AAA	155	Floating	29	Sep-03	2.3	39%
20	Oct-02	Ret.	Australian Prime Property Fund Retail	AAA	120	Fixed	5.75%	Oct-05	3.2	36%
21	Oct-02	Ret.	Australian Prime Property Fund Retail	AAA	25	Floating	43	Oct-05	3.2	36%
22	Nov-02	Div.	TMT Finance Pty Limited	AAA	112	Floating	59	Nov-07	2.9	37%
23	Nov-02	Ret.	Centro Capital Pty Ltd - Seri	AAA	180	Floating	53	Nov-07	2.3	40%
24	Dec-02	Ind.	Deutsche Industrial Finance 2002 - CMBS Trust	AAA	136	Floating	46	Dec-05	2.7	38%
25	Dec-02	Ind.	Deutsche Industrial Finance 2002 - CMBS Trust	AAA	100	Fixed	5.63%	Dec-05	2.7	38%
26	Dec-02	Ret.	Leda Asset Securitisation Pt	AAA	134	Floating	45	Dec-05	2.3	37%
27	Mar-03	Ret.	Centro Capital Pty Ltd - Series 2	AAA	128	Floating	63	Dec-09	2.6	37%
28	Apr-03	Ind.	ING Industrial Finance	AAA	13	Fixed	6.25%	Jul-07	2.6	38%
29	Apr-03	Ind.	ING Industrial Finance	AAA	27	Floating	40	Jul-07	2.6	38%
30	Apr-03	Off.	Investa Properties Limited	AAA	95	Fixed	6.00%	Nov-06	2.2	39%
31	Apr-03	Off.	Investa Properties Limited	AAA	85	Floating	40	Nov-06	2.2	39%
32	May-03	Ind.	ING Industrial Finance	AAA	5	Floating	40	Jul-07	2.6	39%
33	Sep-03	Off.	Macquarie Office	AAA	152	Fixed	5.75%	Sep-06	2.4	34%
34	Sep-03	Off.	Macquarie Office	AAA	250	Floating	43	Sep-06	2.4	34%
35	Oct-03	Div.	Mirvac Capital Pty Ltd - Series 2003-1	AAA	102	Fixed	6.25%	Oct-08	2.3	39%
36	Oct-03	Div.	Mirvac Capital Pty Ltd - Series 2003-2	AAA	88	Floating	34	Oct-08	2.2	39%
37	Oct-03	Ret.	ALE Finance	AAA	100	Fixed	6.60%	Nov-08	3.1	43%
38	Oct-03	Ret.	ALE Finance	AAA	110	Floating	47	Nov-08	3.1	43%
39	Oct-03	Ret.	Quay 62 Pty Ltd Series 2003-1	AAA	210	Fixed	6.75%	Nov-08	1.9	41%
40	Oct-03	Ret.	Quay 62 Pty Ltd Series 2003-1	AAA	240	Floating	45	Nov-08	1.9	41%

No.	Issue Date	Sec.	Issuer	Rating	Issued Amt (AU$m)	Cpn Type	Cpn(%)/BB SW (bp)	SM Date	DSCR**	LTV**
41	Dec-03	Ind.	Quay 62 Pty Ltd	AAA	28	Floating	40	Sep-06	2.7	38%
42	Jan-04	Off.	Macquarie Office	AAA	40	Fixed	5.25%	Sep-06	2.0	40%
43	Jan-04	Off.	Macquarie Office	AAA	80	Floating	43	Sep-06	2.0	40%
44	May-04	Off.	Deutsche Office	AAA	155	Fixed	6.50%	Apr-09	2.1	38%
45	May-04	Off.	Deutsche Office	AAA	345	Floating	40	Apr-09	2.1	38%
46	May-04	Ret.	STOREs Pty Ltd	AAA	150	Floating	39	May-09	2.7	36%
47	Jun-04	Ret.	ING Retail Finance	AAA	65	Fixed	6.15%	Jun-09	2.1	43%
48	Jun-04	Ret.	ING Retail Finance	AAA	126	Floating	35	Jun-09	2.1	43%
49	Jun-04	Div.	Australand Finance	AAA	120	Fixed	6.30%	May-09	2.3	40%
50	Jun-04	Div.	Australand Finance	AAA	73	Floating	37	May-09	2.3	40%
51	Oct-04	Ret.	Quay 62 Pty Ltd	AAA	20	Floating	NK	Nov-08	1.9	41%
52	Dec-04	Div.	TMT Finance Pty	AAA	93	Floating	59	Jun-09	2.5	39%
53	Apr-05	Off.	Quay 62 Pty Ltd	AAA	350	Floating	17	Apr-08	2.0	37%
54	Apr-05	Off.	Quay 62 Pty Ltd	AAA	75	Floating	P	Apr-08	2.0	37%
55	Apr-05	Off.	Macquarie Office	AAA	10	Fixed	5.80%	Sep-06	2.2	38%
56	May-05	Off.	Multiplex MPT	AAA	343	Floating	20	May-08	2.0	40%
57	May-05	Div.	Multiplex MPT	AAA	298	Floating	25	May-10	2.0	40%
58	May-05	Div.	Australand Finance	AAA	3	Floating	21	May-09	2.3	40%
59	Jul-05	Ret.	Walker Finance Pty	AAA	190	Floating	25	Jul-10	1.9	41%
60	Nov-05	Div.	Australand Finance	AAA	51	Floating	NK	Jun-09	2.2	40%
61	Dec-05	Ret.	Walker Finance Pty	AAA	26	Floating	19	Jul-10	1.9	41%
62	Feb-06	Ret.	Leda CMBS Pty	AAA	205	Floating	19	Feb-10	1.9	38%
63	Mar-06	Div	Australand Finance	AAA	169	Floating	17	Mar-11	2.1	40%
64	Apr-06	Div	Cromwell CMBS	AAA	226	Floating	25	Apr-09	2.2	41%
65	Jun-06	Ret.	Centro Capital Pty	AAA	42	Floating	16	Dec-07	2.1	39%
66	Jun-06	Ret.	Centro Capital Pty	AAA	38	Floating	19	Dec-09	2.2	37%
67	Sep-06	Ret.	Quay 62 Pty Ltd	AAA	150	Floating	NK	Nov-08	2.2	31%
68	Sep-06	Off.	Macquarie Office	AAA	360	Floating	20	Sep-09	2.1	37%
69	Sep-06	Off.	Macquarie Office	AAA	125	Floating	24	Sep-11	2.0	37%
70	Dec-06	Off.	Series MCWF 2006-	AAA	330	Floating	25	Dec-09	1.8	44%
71	Dec-06	Off.	WOT CMBS Pty Ltd	AAA	320	Floating	26	Nov-11	2.0	35%
72	Dec-06	Ret.	Centro Shopping Ce	AAA	250	Floating	19	Dec-09	1.7	43%
73	Dec-06	Ret.	Centro Shopping Ce	AAA	300	Floating	24	Dec-11	1.6	43%
74	Dec-06	Ret.	Centro Shopping Ce	AAA	170	Floating	18	Dec-11	1.6	43%

Key:

Ret:	Retail	Off:	Office	Ind:	Industrial	Div:	Diversified
NK:	Unknown	Cpn:	Coupon	SM:	Scheduled Maturity	Sec:	Sector
P:	Private	DSCR:	Debt service coverage ratio	LTV:	Loan-to-value ratio		

Source: Author's compilation from various Standard and Poor's CMBS presale reports

APPENDIX B: COVER LETTER AND QUESTIONNAIRES

1. COVER LETTER

Dear ………………………..

We are currently conducting a property research project concerning the structuring and pricing of commercial mortgage-backed securities (CMBS) in Australia. This is part of the PhD research being done by Mr Bwembya Chikolwa of the Department of Property Studies, School of Economics and Finance, Curtin University of Technology in Perth, who I am co-supervising.

Your contact information is obtained from the following published materials: websites, prospectus and/or annual report. Participation in this mail survey which seeks to gain insight into decision-making issues behind structuring and pricing CMBSs is voluntary. Should the theme of this questionnaire fall under the auspices of other experts in your establishment, please do not hesitate to pass it to them. The questionnaire takes approximately 20-25 minutes to complete. Please complete the enclosed questionnaire and return it to the address below.

The completed questionnaires will be secured in line with university regulations and will only be accessible to the investigators. No information identifying the respondents will be published.

If you require further details regarding this commercial mortgage-backed securities research, please contact me on (02) 9852 4175 or g.newell@uws.edu.au. Thank you for your assistance with this commercial mortgage-backed securities research.

Professor Graeme Newell
Professor of Property Investment
School of Construction, Property & Planning
University of Western Sydney
Locked Bag 1797
Penrith South DC NSW 1797

NOTE: This study has been approved by the Human Research Ethics Committee of Curtin University of Technology. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (tel: 08 9266 2784). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

2. QUESTIONNAIRE ON CMBS ARRANGERS

STRUCTURING AND PRICING COMMERCIAL MORTGAGE BACKED SECURITIES IN AUSTRALIA

Question 1: How do you rank the importance of these debt financing options?

	Rank		Rank
Commercial paper	[ ]	Medium term notes	[ ]
Bank debt	[ ]	Commercial mortgage backed securities (CMBS)	[ ]

Other, please specify: ____

____

Question 2: How many commercial mortgage backed securities (CMBS) issues has your organisation arranged?

	Number	Total Amount of Issue ($m)		Number	Total Amount of Issue ($m)
Past 1 year	—	—	Past 5 years	—	—
Past 3 years	—	—			

Other, please specify: ____

Question 3: Have you been satisfied with the success of the CMBS issues in your organisation?

Dissatisfied	[ ]	Neutral	[ ]	Satisfied	[ ]

Question 4: Does your organisation plan is arrange CMBSs in future?

No	[ ]	Unsure	[ ]	Yes	[ ]

Question 5: How many CMBSs does your organisation anticipate to arrange?

	Number	Total Amount of Issue ($m)
Next 1year	—	—
Next 3 years	—	—

Question 6: What is your organisation's preferred choice of issuing CMBS notes?

Private placement [ ]

Public offering [ ]

If both are preferred, please specify:

____

Question 7: Below is a list of potential motivating factors behind issuance of CMBS notes as a funding source. Rate the importance of each factor.

Funds can be provided at attractive rates as a result of the added credit enhancement and resulting higher credit rating.

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

An improved company's return on capital after removal of securitised assets from the originator's balance sheet which generates cash flow without increasing debt.

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Provision of an alternative source of funding.

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Provision of matched funding for medium and long-term receivables.

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Ability to tap large sources of funds.

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Question 8: When your organisation arranges CMBS transactions, what credit and liquidity enhancement techniques are used and how does it rank the importance of these techniques?

	Considered	Rank		Considered	Rank
Credit tranching	[ ]	___	Cross collateralisation	[ ]	____
Overcollateralisation	[ ]	___	Reserve funds	[ ]	____
Spread accounts	[ ]	___	Amortisation triggers	[ ]	____
Related party guarantees	[ ]	___	Letters of credit	[ ]	____
Monoline insurance	[ ]	___	Multiline insurance	[ ]	____

Question 9: Below is a list of potential factors considered for CMBS notes to obtain a high credit rating. Rate the importance of each factor.

Asset quality: Location; Age; Condition; Tenant retention rate

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Tenant/Lease details: Credit quality of income; Tenancy concentrations; Lease expiry profile

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Portfolio composition: Total number of assets; Diversification (asset class, geographic, sector)

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Management: Quality and experience; Growth strategy

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Financial and other details: Refinancing risk; Transaction support mechanisms/credit enhancement; Gearing (DSCR and LTV ratio)

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 10: When your organisation arranges CMBS issues, what length of bond tenure was used and how does it rank the preference?

	Considered	Rank		Considered	Rank
1 year	[ ]	—	3 years	[ ]	—
5 years	[ ]	—	7 years	[ ]	—

Other, please specify:

____

Question 11: What type of interest rate does your organisation prefer when arranging CMBS issues?

Fixed rate notes	[ ]
Floating rate notes	[ ]

If both are preferred, please specify:

____

Question 12: Below is a list of potential motivating factors behind issuance of fixed rate notes. Rate the importance of each factor.

Security for funding rates

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Matching fixed liabilities

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Not in the business of "betting" on interest rates

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Most investment mandates require fixing rates

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Most financiers require at least some fixed rate

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Question 13: Below is a list of potential motivating factors behind issuance of floating rate notes. Rate the importance of each factor.

Uncertain term of debt required

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Uncertain debt level required

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Break costs of fixed debt can be expensive

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

In-house expertise in interest rate "betting"

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Question 14: Below are refinancing options when the CMBSs mature. Rank the importance of each option.

	Rank		Rank
Equity raising	___	Further capital market debt issues	___
Bank debt	___	Asset sales	___

Other, please specify: ____

Question 15: What is your organisation's preferred option/s of tranching CMBS issues and how does it rank the importance of these options?

Rating	Considered	Rank
Aaa/AA A	[ ]	___
Aa/AA	[ ]	___
A/A	[ ]	___
Baa/BB B	[ ]	___
Ba/BB	[ ]	___
B/B	[ ]	___
N/R	[ ]	___

Other, please specify: ____

Question 16: What level of subordination sequence would you consider ideal for the CMBS issues that you have arranged?

Rating	Subordination required (%)
Aaa/AAA	___
Aa/AA	___
A/A	___
Baa/BBB	___
Ba/BB	___
B/B	___
N/R	___

Question 17: What is your organisation's preferred tranche size for senior Aaa/AAA notes and how does it rank the importance of these preferences?

Issue Value	Considered	Rank
Less than $10 million	[ ]	___
$11 million – $50 million	[ ]	___
$51 million – $100 million	[ ]	___
$101 million – $200 million	[ ]	___
Over $200 million	[ ]	___

Question 18: Below is a list of potential factors considered attractive for investors to invest in CMBS notes. Rate the importance of each factor.

Correlations with other assets

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Issuing agents and underwriting banks

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Denomination of tranche

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Information efficiency

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Market liquidity

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Rating of issues

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Credit enhancement/guarantee

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Term to maturity

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 19: What is your cost estimates of structuring CMBS transactions?

Percentage of value of total issue	**Front-end fees and expenses**	**Running cost of debt funding**	**Running cost of ancillary facilities**	**Cost of first loss cover or credit enhancement**
Less than 0.1%	[ ]	[ ]	[ ]	[ ]
0.1% – 0.2%	[ ]	[ ]	[ ]	[ ]
0.21% – 0.5%	[ ]	[ ]	[ ]	[ ]
0.51% – 1%	[ ]	[ ]	[ ]	[ ]
1.1% – 1.5%	[ ]	[ ]	[ ]	[ ]
Over 1.5%	[ ]	[ ]	[ ]	[ ]

Question 20: What was the duration of the following activities in structuring the CMBS issues that your organisation arranged?

Action	**Duration (Weeks)**
Feasibility study	___
Appointment of parties	___
Data analysis	___
Due diligence	___
Financial modelling	___
Documentation	___
Rating process	___
Marketing	___
Launch and completion	___
Monitoring and reporting	___
Substitution	___

Question 21: What is your organisation's preferred yield spread over the 3 month bank bill swap rate (BBSW) for AAA notes?
(Please tick the most relevant box below):

	Type of Note			
bps	**1-year**	**3-year**	**5-year**	**7-year**
Less than 10	[ ]	[ ]	[ ]	[ ]
10 – 20	[ ]	[ ]	[ ]	[ ]
21 – 25	[ ]	[ ]	[ ]	[ ]
26 – 30	[ ]	[ ]	[ ]	[ ]
31 – 35	[ ]	[ ]	[ ]	[ ]
36 – 40	[ ]	[ ]	[ ]	[ ]
Over 40	[ ]	[ ]	[ ]	[ ]

If possible, please specify the range:
____

Question 22: What is your organisation's preferred yield spreads over the 3 month BBSW for BBB notes?
(Please tick the most relevant box below):

	Type of Note			
bps	**1-year**	**3-year**	**5-year**	**7-year**
Less than 40	[ ]	[ ]	[ ]	[ ]
41 – 50	[ ]	[ ]	[ ]	[ ]
51 – 60	[ ]	[ ]	[ ]	[ ]
61 – 70	[ ]	[ ]	[ ]	[ ]
71 – 80	[ ]	[ ]	[ ]	[ ]
81 – 90	[ ]	[ ]	[ ]	[ ]
Over 90	[ ]	[ ]	[ ]	[ ]

If possible, please specify the range:
____

Question 23: Additional comments:

If you have any comments or observations on structuring and pricing commercial mortgage-backed securities in Australia, please add these comments below.

THANK YOU FOR YOUR ASSISTENCE.

Please return your completed survey to:

Professor Graeme Newell
School of Economics and Finance
University of Western Sydney
Locked bag 1797
Penrith South NSW 1797

3. QUESTIONNAIRE ON CMBS ISSUERS

STRUCTURING AND PRICING COMMERCIAL MORTGAGE BACKED SECURITIES IN AUSTRALIA

Question 1: How do you rank the importance of these debt financing options?

	Rank		Rank
Commercial paper	[ ]	Medium term notes	[ ]
Bank debt	[ ]	Commercial mortgage backed securities (CMBS)	[ ]

Other, please specify: ____
____

Question 2: How many commercial mortgage backed securities (CMBS) issues has your organisation issued?

	Number	Total Amount of Issue ($m)		Number	Total Amount of Issue ($m)
Past 1 year	—	—	Past 5 years	—	—
Past 3 years	—	—			

Other, please specify: ____

Question 3: Have you been satisfied with the success of the CMBS issues in your organisation?

Dissatisfied	[ ]	Neutral	[ ]	Satisfied	[ ]

Question 4: Does your organisation plan is issue CMBSs in future?

No	[ ]	Unsure	[ ]	Yes	[ ]

Question 5: How many CMBSs does your organisation anticipate to issue?

	Number	Total Amount of Issue ($m)
Next 1year	—	—
Next 3 years	—	—

Question 6: What is your organisation's preferred choice of issuing CMBS notes?

Private placement	[ ]
Public offering	[ ]

If both are preferred, please specify:

Question 7: Below is a list of potential motivating factors behind issuance of CMBS notes as a funding source. Rate the importance of each factor.

Funds can be provided at attractive rates as a result of the added credit enhancement and resulting higher credit rating.

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

An improved company's return on capital after removal of securitised assets from the originator's balance sheet which generates cash flow without increasing debt.

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Provision of an alternative source of funding.

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Provision of matched funding for medium and long-term receivables.

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Ability to tap large sources of funds.

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 8: When your organisation issues CMBS transactions, what credit and liquidity enhancement techniques are used and how does it rank the importance of these techniques?

	Considered	**Rank**		**Considered**	**Rank**
Credit tranching	[ ]	___	Cross collateralisation	[ ]	____
Overcollateralisation	[ ]	___	Reserve funds	[ ]	____
Spread accounts	[ ]	___	Amortisation triggers	[ ]	____
Related party guarantees	[ ]	___	Letters of credit	[ ]	____
Monoline insurance	[ ]	___	Multiline insurance	[ ]	____

Question 9: Below is a list of potential factors considered for CMBS notes to obtain a high credit rating. Rate the importance of each factor.

Asset quality: Location; Age; Condition; Tenant retention rate

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Tenant/Lease details: Credit quality of income; Tenancy concentrations; Lease expiry profile

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Portfolio composition: Total number of assets; Diversification (asset class, geographic, sector)

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Management: Quality and experience; Growth strategy

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Financial and other details: Refinancing risk; Transaction support mechanisms/credit enhancement; Gearing (DSCR and LTV ratio)

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 10: When your organisation issued CMBSs, what length of bond tenure was used and how does it rank the preference?

	Considered	Rank		Considered	Rank
1 year	[ ]	—	3 years	[ ]	——
5 years	[ ]	—	7 years	[ ]	——

Other, please specify:
____

Question 11: What type of interest rate does your organisation prefer when arranging CMBS issues?

Fixed rate notes [ ]
Floating rate notes [ ]
If both are preferred, please specify:
____

Question 12: Below is a list of potential motivating factors behind issuance of fixed rate notes. Rate the importance of each factor.

Security for funding rates

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Matching fixed liabilities

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Not in the business of “betting” on interest rates

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Most investment mandates require fixing rates

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Most financiers require at least some fixed rate

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 13: Below is a list of potential motivating factors behind issuance of floating rate notes. Rate the importance of each factor.

Uncertain term of debt required

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Uncertain debt level required

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Break costs of fixed debt can be expensive

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

In-house expertise in interest rate "betting"

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 14: Below are refinancing options when the CMBSs mature. Rank the importance of each option.

	Rank		Rank
Equity raising	—	Further capital market debt issues	—
Bank debt	—	Asset sales	—

Other, please specify: ____

Question 15: What is your organisation's preferred option/s of tranching CMBS issues and how does it rank the importance of these options?

Rating	Considered	Rank
Aaa/AAA	[ ]	___
Aa/AA	[ ]	___
A/A	[ ]	___
Baa/BBB	[ ]	___
Ba/BB	[ ]	___
B/B	[ ]	___
N/R	[ ]	___

Other, please specify: ____

Question 16: What level of subordination sequence would you consider ideal for the CMBS issues that you have arranged?

Rating	Subordination required (%)
Aaa/AAA	___
Aa/AA	___
A/A	___
Baa/BBB	___
Ba/BB	___
B/B	___
N/R	___

Question 17: What is your organisation's preferred tranche size for senior Aaa/AAA notes and how does it rank the importance of these preferences?

Issue Value	Considered	Rank
Less than $10 million	[ ]	___
$11 million – $50 million	[ ]	___
$51 million – $100 million	[ ]	___
$101 million – $200 million	[ ]	___
Over $200 million	[ ]	___

Question 18: Below is a list of potential factors considered attractive for investors to invest in CMBS notes. Rate the importance of each factor.

Correlations with other assets

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Issuing agents and underwriting banks

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Denomination of tranche

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Information efficiency

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Market liquidity

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Rating of issues

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Credit enhancement/guarantee

N/A [ ] Not important [ ] Important [ ] Very Important [ ] Essential [ ]

Term to maturity

N/A	[ ]	Not important	[ ]	Important	[ ]	Very Important	[ ]	Essential	[ ]

Question 19: What is your cost estimates of structuring CMBS transactions?

Percentage of value of total issue	**Front-end fees and expenses**	**Running cost of debt funding**	**Running cost of ancillary facilities**	**Cost of first loss cover or credit enhancement**
Less than 0.1%	[ ]	[ ]	[ ]	[ ]
0.1% – 0.2%	[ ]	[ ]	[ ]	[ ]
0.21% – 0.5%	[ ]	[ ]	[ ]	[ ]
0.51% – 1%	[ ]	[ ]	[ ]	[ ]
1.1% – 1.5%	[ ]	[ ]	[ ]	[ ]
Over 1.5%	[ ]	[ ]	[ ]	[ ]

Question 20: What was the duration of the following activities in structuring the CMBS issues that your organisation issued?

Action	**Duration (Weeks)**
Feasibility study	___
Appointment of parties	___
Data analysis	___
Due diligence	___
Financial modelling	___
Documentation	___
Rating process	___
Marketing	___
Launch and completion	___
Monitoring and reporting	___
Substitution	___

Question 21: What is your organisation's preferred yield spread over the 3 month bank bill swap rate (BBSW) for AAA notes?
(Please tick the most relevant box below):

	Type of Note			
bps	**1-year**	**3-year**	**5-year**	**7-year**
Less than 10	[ ]	[ ]	[ ]	[ ]
10 – 20	[ ]	[ ]	[ ]	[ ]
21 – 25	[ ]	[ ]	[ ]	[ ]
26 – 30	[ ]	[ ]	[ ]	[ ]
31 – 35	[ ]	[ ]	[ ]	[ ]
36 – 40	[ ]	[ ]	[ ]	[ ]
Over 40	[ ]	[ ]	[ ]	[ ]

If possible, please specify the range:

____

Question 22: What is your organisation's preferred yield spreads over the 3 month BBSW for BBB notes?
(Please tick the most relevant box below):

	Type of Note			
bps	**1-year**	**3-year**	**5-year**	**7-year**
Less than 40	[ ]	[ ]	[ ]	[ ]
41 – 50	[ ]	[ ]	[ ]	[ ]
51 – 60	[ ]	[ ]	[ ]	[ ]
61 – 70	[ ]	[ ]	[ ]	[ ]
71 – 80	[ ]	[ ]	[ ]	[ ]
81 – 90	[ ]	[ ]	[ ]	[ ]
Over 90	[ ]	[ ]	[ ]	[ ]

If possible, please specify the range:

____

Question 23: Additional comments:

If you have any comments or observations on structuring and pricing commercial mortgage-backed securities in Australia, please add these comments below.

THANK YOU FOR YOUR ASSISTENCE.

Please return your completed survey to:

Professor Graeme Newell
School of Economics and Finance
University of Western Sydney
Locked bag 1797
Penrith South NSW 1797

APPENDIX C: JOURNAL ARTICLES AND CONFERENCE PAPER

Determinants of Listed Property Trust Bond Ratings: Australian Evidence

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Abstract

Using artificial neural networks (ANN) and ordinal regression (OR) as alternative methods to predict LPT bond ratings, we examine the role that various financial and industry-based variables have on Listed Property Trust (LPT) bond ratings issued by Standard and Poor's from 1999-2006. Our study shows that both OR and ANN provide robust alternatives to rating LPT bonds and that there are no significant differences in results between the full models of the two methods. OR results show that of the financial variables used in our models, debt coverage and financial leverage ratios have the most profound effect on LPT bond ratings. Further, ANN results show that 73.0% of LPT bond rating is attributable to financial variables and 27.0% to industry-based variables with office LPT sector accounting for 2.6%, retail LPT 10.9% and stapled management structure 13.5%.

Keywords:

Listed property trusts; bond rating; ordinal regression; artificial neural networks

1. Introduction

Bonds provide an important mechanism by which firms obtain new funds to finance new and continuing activities and projects. Bond issuance has been

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recognised by Listed Property Trusts (LPTs) as an important debt funding tool. Newell (2007a) and PIR (PCA/IPD 2007a) show the growth in debt levels of LPTs from only 15% in 1997 to 36% as at December 2006. Debt funding has been through direct bank borrowings and issuance of commercial mortgage-backed securities (CMBS) and unsecured bonds. For the period 1999-2006, bonds[23] worth a total of AU$10.5 billion were issued by LPTs (Property Council Australia 2007). In contrast, the Connect 4 Company Prospectuses database shows that LPTs raised AU$18.2 billion in equity raisings, excluding initial price offerings (IPOs). Chikolwa (2007a) also shows that LPTs issued CMBSs worth AU$9.3 over the same period.

In Australia, the bond ratings are assigned by Standard and Poor's, Moody's Investors Service and Fitch Ratings. The ratings inform the public of the likelihood of an investor to receive the promised principal and interest payments associated with the bond issue (Shin & Han 2001) The assigned ratings are important due to the implications they contain regarding the bond issue. Market yields correspond to bond ratings, which indicate an association between rating and risk. For instance, the success of an issue is dependent on obtaining a lower yield which is also influenced by high the credit quality (Alles 2000; Kose et al. 2003). Issues of proprietorship have resulted in the methodology of rating mostly being shrouded in mystery. The methods and input variables used in rating are not fully disclosed to the public (Altman & Rijken 2006; Shin & Han 2001). As such, studies of rating process are of interest not only to bond holders but also to investors.

Bond rating agencies assert that researchers cannot replicate their ratings quantitatively (Kim 2005) as they are the agency's opinion about an issue's potential default risk and that they rely heavily on a committee's analysis of the issuer's ability and willingness to repay its debt. However, researchers have still gone ahead and replicated bond ratings on the premise that the financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). Kamstra

[23] This excludes commercial mortgage-backed securities.

et al. (2001) state that financial variables are able to explain about two thirds of a company's bond rating. Traditionally statistical techniques such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models and more recently artificial neural networks (ANN) have been used to capture and model the expertise of the bond rating process.

To the best of our knowledge, only three studies have examined credit ratings using Australian data (Chikolwa 2007b; Gray et al. 2006; Matolcsy & Lianto 1995). Chikolwa (2007b) find that rating agencies use only a subset of variables they describe or indicate as important to rating CMBS[24] and show the superiority of ANNs over ordinal regressions in predicting CMBS ratings. Gray et al (2006) find that interest coverage and leverage ratios have the most profound effect on credit ratings, using an ordered probit regression. Matolcsy and Lianto (1995) examine the incremental information content of bond rating revisions on stock prices, after controlling for accounting information, using a cross-sectional regression approach. Their finding that only rating downgrades have informational content is consistent with other studies.

This paper extends the analysis of Chikolwa (2007b) and Gray et al. (2006) by mainly applying ANN and OR as alternative methods for predicting ratings on bonds issued by Australian LPTs between 1999 and 2006. Tests are undertaken to compare the predictive power of ANN models and ordinal regression models. We find that both OR and ANN provide robust alternatives to rating LPT bonds and that there are no significant differences in results between the two full models. OR results show that of the financial variables used in our models, debt coverage and financial leverage ratios have the most profound effect on LPT bond ratings. Further, ANN results show that 73.0% of LPT bond rating is attributable to financial variables and 27.0% to industry-based variables; office LPT sector accounting for 2.6%, retail LPT 10.9% and stapled management structure 13.5%.

The paper is structured as follows. Section 2 shows the significance of the bond markets as an unsecured funding source for LPTs. Next, Section 3 reviews

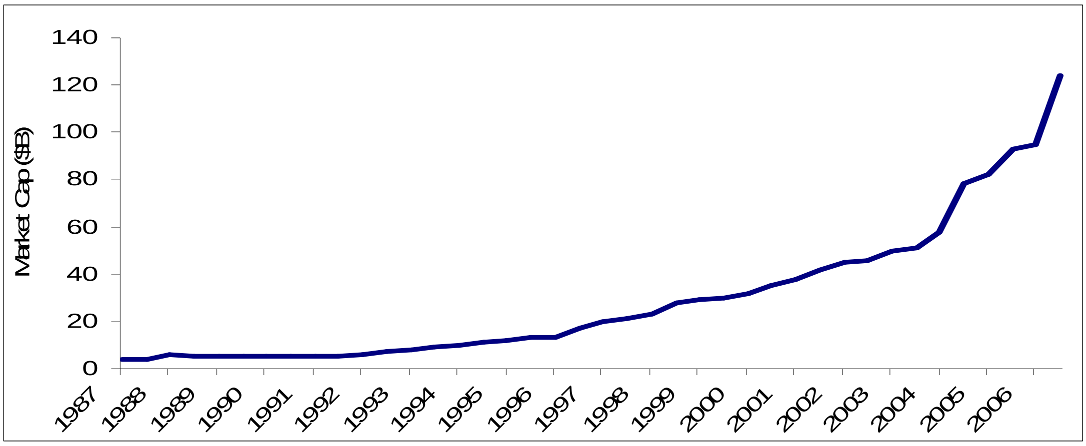
[24] Only Loan-to-value (LTV) ratio was found to be statistically significant.

literature on the use of ANNs in real estate and corporate bond rating studies. Section 4 discusses the data and methodology. The study results and their analyses are shown in Section 5. Concluding remarks and future research directions are shown in Section 6.

2. Significance of Listed Property Trust Bonds

The Australian LPT sector has grown significantly from AU$7 billion in 1992 to over AU$136 billion by market capitalisation as at December 2006, with total assets of over AU$140 billion, comprising over 3,000 institutional-grade properties in diversified and sector-specific portfolios (Newell 2007a; PCA/IPD 2007a). LPTs currently are the third largest sector on the stockmarket and representing over 10% of the total Australian stockmarket capitalisation, compared to only 5% of the total Australian stockmarket capitalisation in 2000 (UBS 2007). Figure 1 shows the growth in LPT market capitalisation since 1987.

Figure 1: Growth in Australian LPT Market Capitalisation: 1987-2006



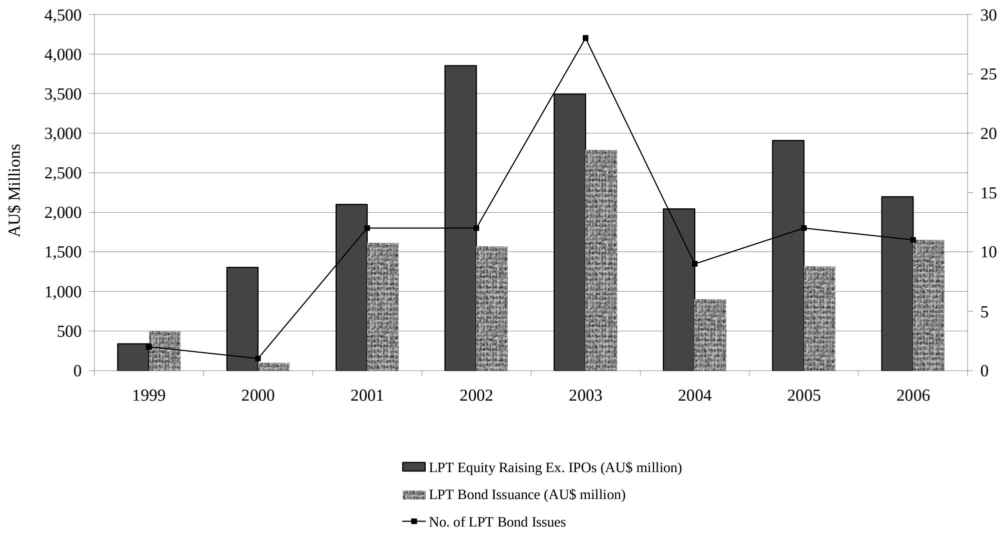
Source: Newell (2007a)

Diversified LPTs have a market share of 32% by market cap., office LPTs have 11%, retail LPTs 43% and industrial LPTs 12% (UBS 2007). Unlike US REITs, Australian LPTs do not have residential property in their portfolios.

The maturing nature of the LPT market has seen the increased sophistication of LPT debt management. Intense competition and pressure to add value to LPT returns have required LPT managers to be more sophisticated in capital and debt management (Blundell 2001). A range of sophisticated debt products including CMBS, property trust bonds, hybrids and off-balance sheet financing have been used as a natural hedging strategy by LPTs with international property exposure and also to fund acquisitions. As at December 2006, LPTs had on average debt levels of 36% from 10% in 1995 (Newell 2007a; PIR 2006) with some LPTs with 100% international property having debt levels in excess of 50%; eg: Rubicon America, Reckson NY Property, Galileo Shopping America (Newell 2006a).

With regards to LPT bond issuance, the total cumulative issuance volume from 1999 to December 2006 reached AU$10.5 billion, with 87 issues as shown in Figure 2. Generally, annual LPT bond issuance has remained stable at around AU$1.5 billion, with the exception of the year 2003 when issuance nearly reached AU$2.8 billion. LPT bond issuance as a funding source can be compared to LPT equity raisings, excluding initial price offerings (IPOs). Although LPTs have raised more funds through issuing additional securities (AU$18.2 billion), bond issuance has featured prominently as well at an average of 65% of equity raisings. For instance in 2006, LPTs issued bonds worth AU$1.7 billion and raised AU$2.2 billion through issuance of additional securities.

Figure 2: Australian LPT Bond Issuance and Equity Raisings Ex. IPOs: 1999-2006



Sources: Author's compilation from various Property Australia magazines and Connect 4 Company Prospectuses database (1999-2006)

To further emphasise the importance of issuance of bonds by LPTs as a funding source, we compare with the issuance of commercial mortgage-backed securities (CMBS) which is dominated by LPTs (Chikolwa 2007a; Standard & Poor's 2005b)[25] from 2000 to 2006; see Table 1. Although more funds have been raised via CMBS (AU$14.3 billion) than LPT bonds (AU$10 billion), more LPT bonds (total number issued 85) have been issued in number than CMBSs (total number issued 66). Furthermore, in certain years (2001 and 2003) more funds where raised via LPT bonds than CMBS issuance.

[25] Listed Property Trusts have a 65% CMBS market share.

Table 1: Australian LPT Bond Issuance and CMBS Issuance: 1999-2006

Year	CMBS Issuance		LPT Bond Issuance	
	AU$ million	No. of Issues	AU$ million	No. of Issues
2000	$357	2	$100	1
2001	$1,320	5	$1,615	12
2002	$2,845	19	$1,570	12
2003	$2,191	14	$2,792	28
2004	$1,513	7	$905	9
2005	$2,102	8	$1,320	12
2006	$4,013	11	$1,650	11
Total	$14,340	66	$9,952	85

Sources: CMBS issuance: Chikolwa (2007a); LPT bonds: Author's compilation from various Property Australia magazines (1999-2006)

The Australian LPT bond market has remained competitive in comparison to their US equivalent, REITS unsecured debt offerings, with the two countries showing its increase in importance as a debt funding source. Table 2 shows LPT bond issuance and US REIT unsecured debt offerings by value and number from 1999-2006.

Table 2: Australian LPT Bond Issuance and US REITS Unsecured Debt Offerings: 1999-2006

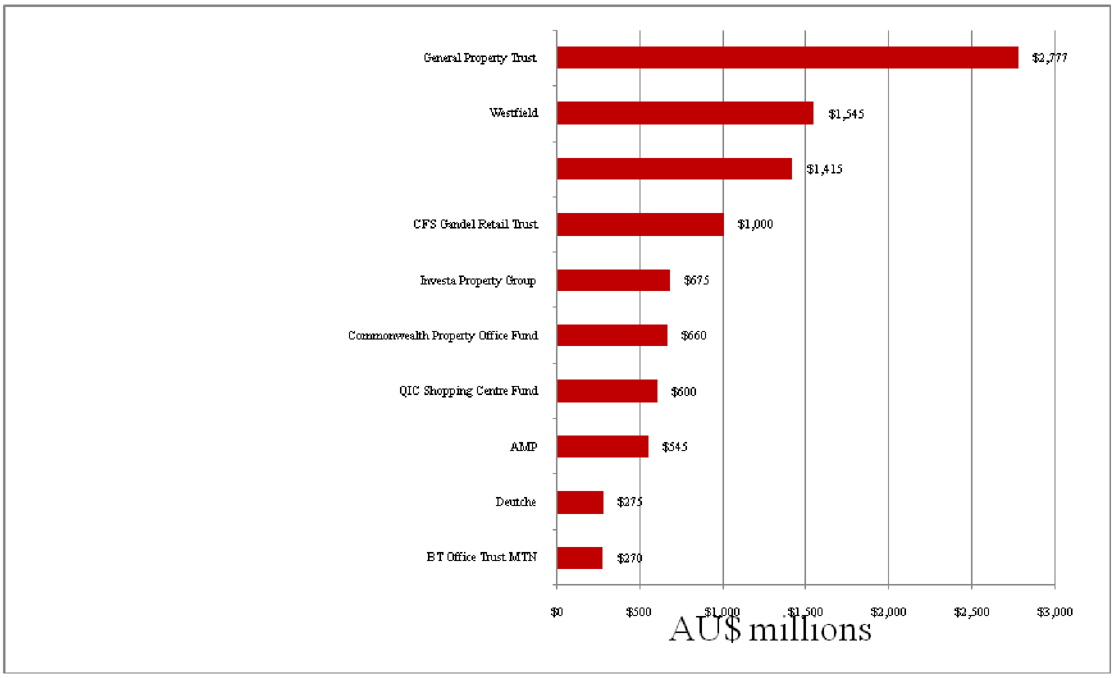
Year	LPT Bonds		US REIT Unsecured Debt Offerings	
	AU$m	No. of Issues	AU$m	No. of Issues
1999	$500	2	$10,337	69
2000	$100	1	$9,117	70
2001	$1,615	12	$12,864	44
2002	$1,570	12	$13,830	71
2003	$2,792	28	$14,163	68
2004	$905	9	$22,499	97
2005	$1,320	12	$21,230	105
2006	$1,650	11	$32,841	82
Grand Total	$10,452	87	$136,880	606

US$1 = AU$0.7692 as at 31 December 2006

Source: LPT bonds: Author's compilation from various Property Australia magazines (1999-2006); US REITS: NAREIT website

Figure 3 shows the top 10 LPT bond issuers who command a 93% market share and have issued bonds worth a combined total of AU$9.8 billion from 1999-2006. Major players in the LPT bond market include GPT (AU$2.8 billion), Westfield (AU$1.5 billion), Stockland (AU$1.4 billion) and CFS Gandel Retail Trust (AU$1 billion).

Figure 3: Top 10 Australian LPT Bond Issuers: 1999-2006

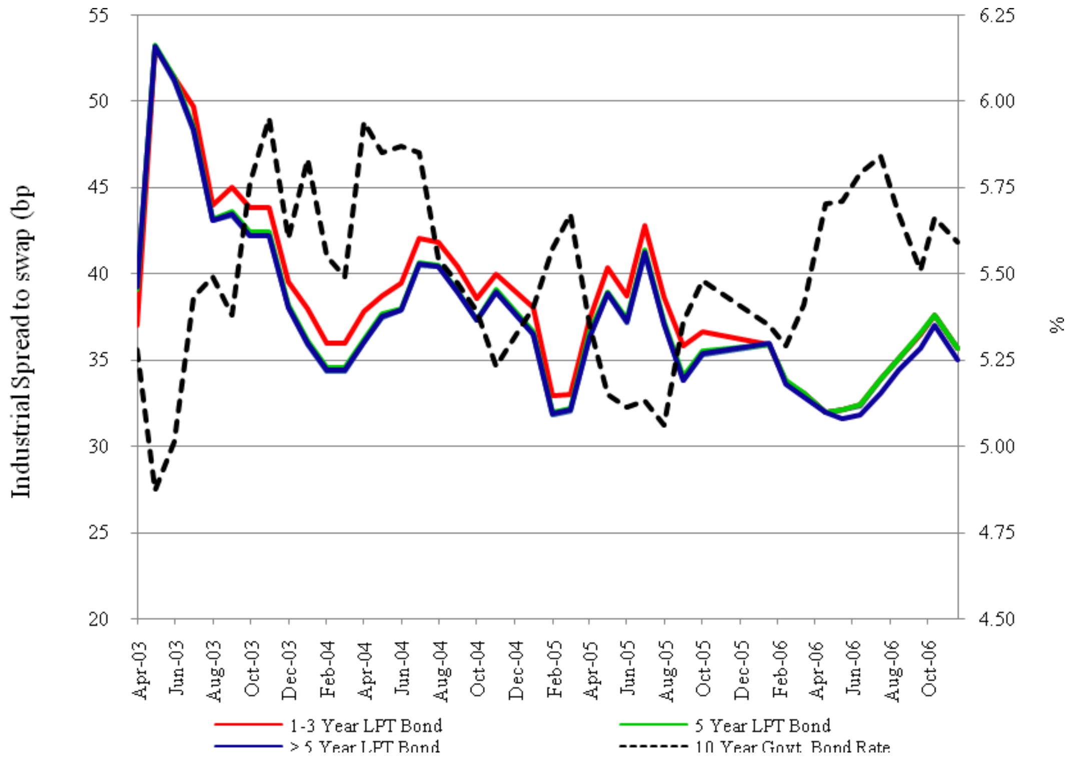


Source: Author's compilation from various Property Australia magazines (1999-2006)

An interesting feature is that of the top 5 LPT bond issuers, only the Investa Property Group have issued CMBSs with the remaining preferring only LPT bond issuance. Further, of the top 5 LPT bond issuers, Westfield, General Property Trust and Stockland are in the UBS Leaders 300 Index, emphasizing their ability to use their balance sheet to back bond issuance.

Figure 4 shows an inverse relationship between industry spread to swaps and 10-year government bond rates; as 10-year government bonds rates rise, industry spread to swaps tighten and vice versa. Generally, 1-3 year LPT bonds have been priced at 2-3bp above 5 year LPT bonds. There are no marked differences in swaps between 5 year and above LPT bonds.

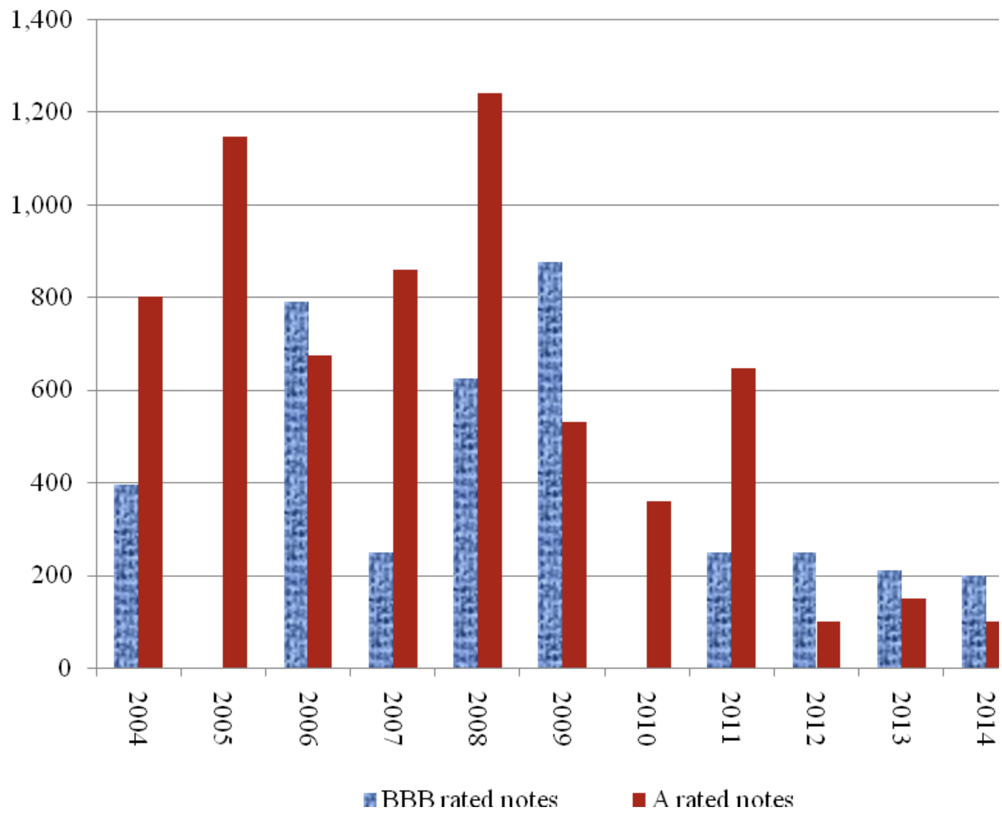
Figure 4: Australian LPT Bond Industry Spread to Swap and 10-Year Government Bond Rates: April 2003 - October 2006



Sources: Author's compilation from various Property Australia magazines (1999-2006) and RBA (2007)

The sub-prime mortgage market events in the US are having an impact on the global bond markets and may have an impact on the refinancing prospects for maturing LPT bonds. Figure 5 presents the maturity profile of all the LPT bonds issued between 1999 and 2006. Nearly AU$3.3 billion worth of LPT bonds are maturing in 2008-2009, of which 45.9% are BBB rated bonds. As investors require greater compensation to invest in BBB rated bonds, refinancing will become more expensive.

Figure 5: Australian LPT Bond Maturity Profile



Source: Author's compilation from various Property Australia magazines (1999-2006)

The macroeconomic outlook for the Australian market remains benign, with historically low unemployment rates and a low interest environment expected to continue. However, liquidity and valuation issues surrounding securitised debt backed by sub-prime mortgages in the US home market has resulted in the 'credit crunch' in the global financial system due to an increased perception of risk on the part of lenders. This has resulted in higher spreads on securitisable financial receivables and unsecured debt offerings.

3. Literature Review

ANNs are trainable analytical tools that attempt to mimic information processing patterns in the human brain. They are applied to a wide variety of pattern matching, classification, and prediction problems and are useful in many financial applications such as: stock price prediction, development of security trading systems, modelling foreign exchange markets, prediction of bond ratings, forecasting financial distress, and credit fraud detection and prevention. Comprehensive reviews of articles demonstrating the use of ANNs in various finance situations can be found in Fadlalla and Lin (2001); Coakley and Brown (2000); and Krishnaswamy et al. (2000).

Neural networks are regarded by many authoritative commentators as a useful addition to standard statistical techniques, and are in fact themselves based on statistical principles. Statistical methods such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models have been used in order to capture and model the expertise of the bond rating process. Frequently these studies are in form of comparative analysis, with researchers contrasting them with the findings and perceived efficiency of ANNs. Salchenberger et al. (1992) and Tam and Kiang (1992) state that the main advantage ANNs have over statistical methods is that they do not require priori specification of a function form, but rather they attempt to learn from the training input-output examples alone.

3.1 Artificial Neural Networks in Real Estate Studies

ANN has recently earned a popular following amongst real estate researchers covering aspects such as real estate valuation: Tay and Ho (1991), Evans and Collins (1992), Worzala et al. (1995), Kauko (2004), Lai and Fischer (2006), Pagourtzi et al. (2007); examination of the impact of age on house values: Do and Grudnitski (1992); prediction of house value: McGreal et al. (1998), Nguyen and Cripps (2001) and Lai (2005); forecasting commercial property values: Connellan and James (1998a) and Connellan and James (1998b); predicting commercial mortgage-backed securities credit ratings: Chikolwa (2007b); and the impact of environmental characteristics on real estate prices: Kauko (2003).

Most of the studies, except for Worzala et al. (1995) and Lenk et al. (1997), show that ANNs have a superior predictive capacity over traditional statistical techniques. Worzala et al. and Lenk et al. noted that ANNs where not necessarily superior over traditional statistical techniques.

The increased use of neural networks by academic and commercial analysts in real estate studies is motivated by their recognition of complex patterns of multivariate property data (Connellan & James 1998a). This increased use of ANN methodology in the commercial real estate research gives credence to its extension to research in predicting ratings on bonds issued by LPTs.

3.2 Artificial Neural Networks in Corporate Bond Studies

Several studies show that ANNs can be applied to bond rating: Dutta and Shekhar (1988); Surkan and Singleton (1990); Maher and Sen (1997); Kwon et al. (1997); Daniels and Kamp (1999); Chaveesuk et al. (1999); Yesilyaprak (2004); Huang et al. (2004); and Kim (2005).

Kim (2005) used an adaptive learning network (ALN) on a sample of 1080 observations (companies) primarily collected from the CMPUTSTAT database, Dun and Bradstreet database, and Standard and Poor’s bond manuals to predict their rating. The overall performance of the model shows that the trained ALN model was successful in predicting 228 (84%) out of 272 cases. The further showed a prediction accuracy of 88% and 91% for investment grade and speculative bonds respectively.

Yesilyaprak (2004) compared ANNs and MDA and multinomial logit (ML) techniques for predicting 921 bonds issued by electric utility (367), gas (259), telephone (110) and manufacturing companies (185). ANNs (57 – 73 %) performed better than both MDA (46 – 67 %) and ML (46 – 68 %) in predicting the bond rating in three samples. ML (68 %) performed better in predicting the bond rating (in one sample (electric utility).

Huang et al. (2004) compared back propagation neural networks and vector support machine learning techniques for bond rating in Taiwan and the United States. The data set used in this study was prepared from Standard and Poor’s CompuStat financial data. They obtained a prediction accuracy of 80%.

Chaveesuk et al. (1999) compared the predictive power of three NN paradigms-back propagation (BP), radial basis function (RBF) and learning vector quantisation (LVQ)- with logistic regression models (LRM). Bond issues of 90 companies were randomly selected from the 1997 issues listed by Standard and Poor's. LVQ (36.7%) and RBF (38.3%) had inferior results to BP (51.9%) and LRM (53.3%). BP only performed slightly better than LRM. They further concluded that assignment of bond ratings is one area that is better performed by experienced and specialised experts since neither NN nor LRM produced accurate results.

Daniels and Kamp (1999) modelled the classification of bond rating using NN with one hidden layer; and a linear model using ordinary least squares (Srinivasan & Bolster). Financial figures on bonds issued by 256 companies were selected from Standard and Poor's DataStream. The percentage of correct classification ranged from 60-76% for NN and 48-61% for OLS.

Maher and Sen (1997) compared the performance of neural networks with that of logistic regression. NN performed better than a traditional logistic regression model. The best performance of the model was 70% (42 out of 60 samples).

Kwon et al. (1997) compared the predictive performance of ordinal pairwise partitioning (Shopping Centre Council of Australia) approach to back propagation neural networks, conventional (CNN) modelling approach and MDA. They used 2365 Korean bond-rating data and demonstrated that NNs with OPP had the highest accuracy (71-73%), followed by CNN (66-67%) and MDA (58-61%).

Surkan and Singleton (1990) also investigated the bond rating abilities of neural networks and linear models. They used MDA, and found that NNs outperformed the linear model for bond rating application.

Dutta and Shekhar (1988) were the first to investigate the ability of neural networks (NNs) to bond rating. Their sample comprised bonds issued by 47 companies randomly selected from the April 1986 issues of Value Line Index and the Standard and Poor's Bond Guide. They obtained a very high accuracy of

83.3% in discerning AA from non-AA rated bonds. However, the sample was so small that it simply amounted to showing the applicability of neural networks to bond rating.

In summary, most studies on ANNs showed promising results than those of other classification methods. The current study attempts to extend the use of ANNs to predict ratings on LPT bonds. The predictive capacity of ANNs is further compared to that of OR.

4. Data and Methodology

4.1 Data

Our initial sample consists of all 87 Standard and Poor's rated bonds issued by Australian property trusts between 1999 and 2006 as found in the Property Australia magazine. After removing bonds that had incomplete financial information, our sample was reduced to 77. Concurrent and complete financial report information for the period 1999 to 2006 is obtained from the Aspect Fin Analysis database. We follow Gray et al (2006) definition of annual financial report as being contemporaneous with the rating if it relates to the financial year-end that occurs three to fifteen months prior to the rating. This ensures that any changes based on information released in the annual report are captured in the corresponding rating. Three-year averages of relevant financial ratios rather than the most recent observations are used in line with the 'rating through the cycle'[26] process which is adopted by credit rating agencies to capture the longer-term perspective (Carey & Hrycay 2001; Carey & Treacy 2000).

In order to have a reasonable number of observations in each rating class, the agency rating classes A, A+ and A3* are combined into a single rating class A, and the agency-rating classes BBB and BBB+ are combined into a single rating class BBB+. Further, the reclassification of tranches into three classes could enhance model performance because mathematical and statistical approaches have general limits in dealing with ordinal nature of bond rating. It known that as the number of bond classification increases, the predictive power could likely

[26] This is described as a rating assessment in a worst case scenario, in the bottom of a presumed credit quality cycle.

decrease (Kwon et al. 1997). Table 3 provides summary statistics over time and by sector.

Table 3: Distribution of Sample Observations Over Time, Rating Class and Sector

	A	A-	A+	A3*	BBB	BBB+	***Total***
			Panel A: LPT Bond Rating by Year				
1999	1					1	***2***
2000	1						***1***
2001	2	7				3	***12***
2002	4	2	3	1		2	***12***
2003	4	19				5	***28***
2004	1	4				4	***9***
2005	3	3				6	***12***
2006	1	4			2	4	***11***
Total	***17***	***39***	***3***	***1***	***2***	***25***	***87***
			Panel B: LPT Bond Rating by Sector				
Diversified	3	15	3		2	16	***39***
Office		6		1		9	***16***
Retail	14	18					***32***
Total	***17***	***39***	***3***	***1***	***2***	***25***	***87***

1.2 Selection of Variables

Bond rating recognises the following areas of attention: profitability; liquidity; asset protection; indenture provisions; and quality of management. Bond rating models use independent variables, often calculated as ratios, which are predominantly derived from public financial statements. The assumption is that financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). The primary reference for modelling bond ratings which has been utilised directly or with minor variations is the Kaplan and Urwitz (KU) (1979) model. The KU model uses financial ratios relating to leverage, coverage, liquidity, profitability, and size. Rating agencies list qualitative factors such as management ability, value of intangible assets, financial flexibility, operating efficiency, industry risk, accounting quality and market position as being important in their rating process (Moody's Investor Service 2002). However, most of these qualitative factors are likely reflected in the quantifiable data such as financial and non-financial variables, and could be assessed indirectly from analysing these quantifiable data (Kim 2005).

Consistent with information provided by Standard and Poor's (2007) and Moody's Investor Service (2002) and with the approach used by Gray et al. (2006), we model LPTs credit rating as a function of its financial characteristics given by interest coverage, profitability and leverage and industry characteristics. Credit ratings tend to be highly sensitive to the firm's interest coverage ratio- firms with higher coverage ratios are likely to have higher credit ratings. Profitability is another signal of the firm's ability to generate cash to meet its financial obligations- a high profitability ratio is more likely to be associated with a better credit rating. Cash flow or debt coverage ratios, such as free cash flows relative to total debt, are important in credit analysis as they provide an indication of the firm's present ability to service its debt and meet its financial obligations. A low cash-flow-to-debt ratio may be symptomatic of higher risk and a signal of weak prospects. High cash flow relative to total debt is associated with higher credit ratings. Further, higher leverage factors, measured as debt to total assets, reduce the cushion the firm has with respect to any incremental changes in its fortunes. Higher leverage is associated with lower credit ratings. In addition, long-term debt leverage is generally higher for firms with lower ratings.

Blume et al (1998) hypothesises that a firm with higher equity beta is expected to have a lower credit rating as it will be less able to service its debt for given accounting ratios as its equity risk increases. However, there have been inconsistent results in prior literature of using equity beta as a predictor variable in credit rating. Earlier studies (KU) found it to be a significant variable in credit rating prediction, while recent studies (Crabtree & Maher 2005; Gray et al. 2006; Maher & Sen 1997) have all found it to be insignificant. As such our models do not include beta a predictor variable.

The log of assets provides a robust measure of firm size, while at the same time providing a rational proxy for information asymmetry in view of the fact that information asymmetry typically decreases as a firm size increases (Krishnaswami et al. 1999). As such we hypothesise that bonds issued by large LPTs by asset size should command higher ratings.

Rating agencies suggest that credit ratings should depend, in part, on the firm's business environment. Numerous industry characteristics including competitiveness, barriers to entry, exposure to technological change, regulatory environment and vulnerability to economic cycles can have a significant influence on the level of business risk a firm faces (Gray et al. 2006; Iskander & Emery 1994). For instance, Moody's Investor Service (2003) find competitive pressures, characteristics of the catchment areas, and expectations of future developments to have a greater impact in their rating of retail LPTs and vacancy rates, tenant demand trends, and future stock additions on office LPTs. Retail LPTs exhibit cash flow stability than office or industrial LPTs, given Australia's relatively steady consumer spending trends as well as the long-term nature of their lease structures. Consequently, an office LPT is expected to generate stronger debt coverage ratios at a given level. A more stable and predictable cash flow should translate into a lower level of business risk and hence a lower credit risk. To control for possible LPT sector effects, indicator variables (0,1) for each LPT sector in the sample are included. An LPT sector dummy (0,1) is added as an independent variable to the benchmark model for two (i.e. n - 1) groups

Stapled securities account for over 75% of the LPT market capitalisation, compared to only 29% in 2004 (Newell 2006a). Tan (2004b) show that the adoption of this internal management structure has enabled a closer alignment of unit holders and manager interests, no fee leakage and a lower cost of capital. Further, Newell (2006a) state that the adoption of the internal management structure has not increased LPT risk levels. However, Standard and Poor's (2007) assert that LPTs exposure to non-lease-related income may constrain their credit rating as these activities carry much higher business risk than traditional, passive asset management, which reduces the firm's percentage of income-producing assets and its debt capacity at all rating levels. To control for possible LPT stapled-structure effects, indicator variables (0,1) for each LPT stapled-structure in the sample are included. An LPT stapled-structure dummy (0,1) is added as an independent variable to the benchmark model for one (i.e. n - 1) group.

Descriptive statistics regarding the sample are provided in Panel A and variable definitions in Panel B of Table 4.

Table 4: Descriptive Statistics and Variable Definitions

Variable		*Minimum*	*Maximum*	*Mean*	*Std. Dev.*
Panel A: Descriptive Statistics					
DA		0.08	0.38	0.23	0.07
OCD		0.08	0.52	0.24	0.08
NS		1.05	3.74	2.27	0.78
TA	~	8.89	9.96	9.56	0.29
LS_1		0.00	1.00	0.18	0.39
LS_2		0.00	1.00	0.32	0.47
SS		0.00	1.00	0.68	0.47
Panel B: Variable Definitions					
DA	3-year average of total debt divided by 3-year average of total assets.				
OCD	3-year average of operating cash flow divided by 3-year average of total debt.				
TA	Natural log of 3-year average of total assets.				
NS	3-year average of net tangible assets per share.				
LS_1	Indicator variable set equal to 1 if the bond is backed an office LPT, 0 otherwise.				
LS_2	Indicator variable set equal to 1 if the bond is backed an retail LPT, 0 otherwise.				
SS	Indicator variable set equal to 1 if the bond is backed a LPT with a stapled structure, 0 otherwise.				

~ In millions

Table 5 provides the bivariate correlations that exist between the data items.

Table 5: Spearman Correlation Coefficients

	TA	*DA*	*OCD*	*NS*	*LS_1*	*LS_2*	*SS*
TA	1.000						
DA	0.180	1.000					
OCD	-0.028	-.745(**)	1.000				
NS	.610(**)	-0.083	-0.154	1.000			
LS_1	-.350(**)	.363(**)	-.265(*)	-.514(**)	1.000		
LS_2	0.015	0.101	0.099	-.274(*)	-.327(**)	1.000	
SS	.662(**)	-0.089	0.027	.772(**)	-0.177	-.408(**)	1.000

**Indicates significance at the 1% level, * indicates significance at 5% level.

A number of models are used. Our benchmark Model 1 includes NTA per share (NS), Total debt/total assets (DA), operating cash flows/total debt (OCD) and log of total assets (TA) as independent variables. Model 2 tests whether the office LPT sector (LS_1) has an impact on bond rating. We further test whether retail

LPT sector (LS_2) has an impact on bond rating in Model 3. In model 4, test the combined effect on LPT sector (LS_1 and LS_2) have on LPT bond rating. Finally, Model 5 has all the independent variables in Models 1 and 5 in addition to the stapled-structure (SS) variable. LPT bond rating is the dependent variable in all the models.

To test the hypotheses, ordinal regressions are applied to the LPT bond sample whereas prediction of accuracy in bond rating for ANN evaluates their contribution to the model.

1.3 Description of OR Model

There is a general consensus on the inappropriateness of least squares methods to rate bonds as they ignore their ordinal nature (Kamstra et al. 2001). OR has been considered appropriate as it accommodates the ordinal nature of bond ratings.

The model is similar to the general multiple linear regression model but defines Y_i and estimates β differently.

The logistic model computes the probabilities that an observation will fall into each of the various rating categories. The observation is classified into the category with the highest probability. This probability is estimated by the logistic model as:

$$\operatorname{log}it(p_i) = \log\left[\frac{p_i}{1-p_i}\right]$$

$$= \beta_0 + \beta_1\ X_{i1} + \beta_2\ X_{i2} + \ldots\ldots \beta_n\ X_{in}$$

(1)

where:

r = bond rating category;

p_i = $P\ (Y_i = r);$

i = 1…n, where n is the sample size; and

$X_{i1,\ldots,}, X_{in}$ are predictor variables.

The β s are estimated by maximising the log-likelihood function:

$$\sum_{i=1}^{N} P(\beta; Y_i) = \sum_i \ln\left(\frac{1}{1-e^{-\beta X_i}}\right) \qquad (2)$$

where β is the vector of the parameters to be estimated. Once β's are estimated, p_i is estimated by

$$p_i = \frac{1}{1+e^{-\beta X_i}}$$

(3)

The observation is assigned to the bond rating category with the highest predicted probability. These predictions are compared to the actual bond rating assigned to the issue to calculate classification accuracy for the model.

The observed value on Y_i depends on whether or not a particular threshold has been crossed.

Y_i = BBB+ if Y_i^* is $\leq \beta_1$

Y_i = A- if $\beta_1 \leq Y_i^* \leq \beta_2$

Y_i = A if $Y_i^* \geq \beta_2$

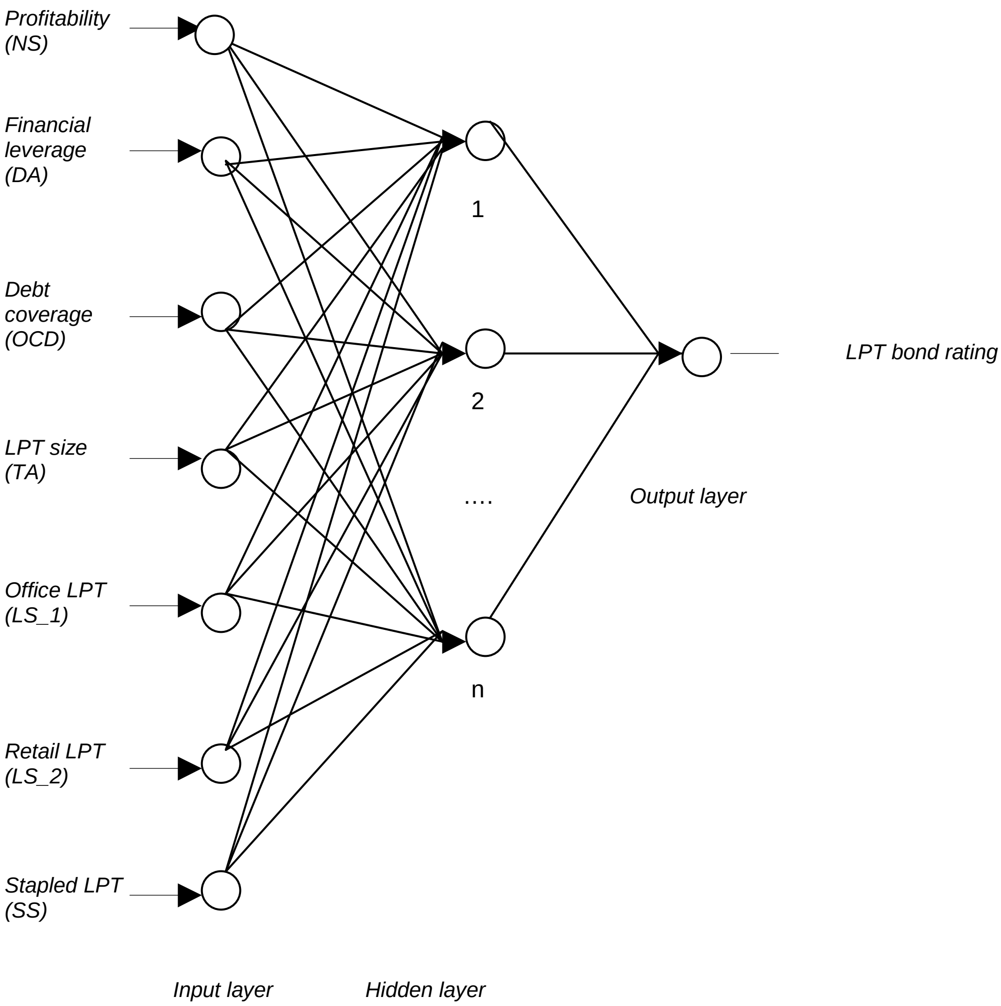
OR regressions were where carried out in SPSS® version 15.0 (SPSS Inc. 1968).

4.4 Description of ANN Model

ANN models have three primary components as shown in Figure 5:

1) The input layer;
2) The hidden layer(s), commonly referred to as the ‘black box’; and
3) The output measure(s) layer, the estimated LPT bond rating.

Figure 5: Structure of a LPT Bond Rating Neural Network



The hidden layer(s) contain two processes: the weighted summation functions; and the transformation functions. Both of these functions relate the values from the input data (e.g. NS, DA, OCD, TA, LS_1, LS_2 and SS variables) to output measures (LPT bond rating). The weighted summation function typically used in a feed-forward/back propagation neural network is:

$$Y_j = \sum_{j}^{n} X_i W_{ij} \tag{4}$$

where $\mathbf{X}_i$ is the input values and $\boldsymbol{W_{ij}}$ the weights assigned to the input values for each of the $\boldsymbol{j}$ hidden layer nodes. A transformation function then relates the summation value(s) of the hidden layer(s) to the output variable value(s) or $\boldsymbol{Y_j}$. This transformation function can be of many different forms: linear functions, linear threshold functions, step linear functions, sigmoid functions or Gaussian functions. Most software products utilise a regular sigmoid function such as:

$$Y_T = \frac{1}{1 + e^{-y}} \qquad (5)$$

This function is preferred due to its non-linearity, continuity, monotonicity, and continual differentially properties (Do & Grudnitski 1992).

Alyuda Forecaster XL® (Alyuda Research Inc. 2001) was used for the ANN experimentation. In the case of our 4-7 input and 3 output network, the hidden units where automatically set at 9 (model 1), 12 (model 2), 33 (Model 3), 33 (model 4) and 6 (model 5).

5. Empirical Results and Analysis

5.1 OR

The results of the ordinal regression analyses are shown in Table 4. To empirically specify the model, three tests were used: the standard technique of likelihood ratio test, the significance of the individual coefficients, explanatory power (pseudo R-Square) and the accuracy of the predicting rate.

Table 4: OR Results

Variable (Expected Sign)	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
A-	37.741	37.959	66.040	98.773	115.803
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
	[13.224]	[13.062]	[23.116]	[26.309]	[10.888]
A	39.160	39.378	68.050	101.774	120.730
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
	[14.029]	[13.856]	[24.007]	[26.981]	[11.505]
Profitability (NS)	1.026	1.011	2.974	6.663	18.749
(+)	(0.014)	(0.022)	(0.000)	(0.000)	(0.000)
	[5.996]	[5.272]	[23.300]	[31.959]	[19.956]
Financial leverage	-18.475	-18.206	-22.858	-47.179	-108.561
(DA) (-)	(0.007)	(0.010)	(0.002)	(0.000)	(0.000)
	[7.234]	[6.665]	[9.352]	[18.071]	[13.025]
Debt coverage	11.565	11.509	14.048	23.334	51.465
(OCD) (+)	(4.729)	(0.030)	(0.020)	(0.005)	(0.004)
	[0.030]	[4.685]	[5.445]	[7.893]	[8.320]
LPT size (TA)	3.513	3.539	6.933	10.771	13.002
(+)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
	[9.443]	[9.377]	[21.043]	[26.800]	[12.387]
Office LPT (LS_1)		0.115		-7.731	-23.554
		(0.874)		(0.000)	(0.000)
		[0.025]		[21.822]	[14.660]
Retail LPT (LS_2)			-3.547	-8.588	-16.273
			(0.000)	(0.000)	(0.000)
			[24.257]	[30.982]	[19.318]
Stapled LPT (SS)					13.295
					(0.000)
					[15.774]
Chi-Square	21.908	21.935	50.956	83.183	123.581
*Pseudo R-Square	0.131	0.132	0.306	0.499	0.741

*We utilise McFadden's pseudo R-Square based on Ederington (1985) who recommend it as being the most attractive intuitively as well as theoretically of all others. Regression coefficients provided with significance levels (in parenthesis) and Wald chi-square [in brackets].

The primary control variables (NS, DA, OCD and TA) are all significant at .05 level in the predicted direction. The industry-based variables (LS_1, LS_2 and SS) are each found to be significant when added individually and together to the benchmark model. In results not shown in this study, we find year of bond issue and size of bond issue to be statistically insignificant. All the models are significant at .05 level with Likelihood Ratios ranging between 21.9 and 123.5. Our results are comparable to other studies (Blume et al. 1998; Crabtree & Maher 2005; Gray et al. 2006) that have found debt coverage (OSD), leverage (DA) and profitability (NS) to provide explanatory power in the credit rating process. In addition, the significance of the log of total assets (TA) suggests that larger LPTs will command higher credit ratings confirming information asymmetry supposition by Krishnaswami et. al (1999).

The benchmark model 1 had a low pseudo R-square of 0.131 and adding the LPT sector variables individually only raised the pseudo R-square to 0.132 and 0.306 respectively (models 2 and 3). A marked difference in pseudo R-square (0.499) was noted when the two LPT sector variables (LS_1 and LS_2) were added to the benchmark model together (model 4). Overall, model 5 which incorporated all the industry-based variables (LS_1, LS_2 and SS) showed the best pseudo R-square result at 0.741

These results are consistent with the interpretation that retail LPTs have more stable cash flows than office LPTs and the bonds they issue should command higher ratings. Further, despite Standard and Poor’s (2007) assertion that LPTs with exposure to non-lease-related income may constrain their credit rating, we find that the bonds issued by LPTs with stapled management structures command higher credit ratings. A possible explanation would be the higher anticipated returns from LPTs with stapled management structures. To investigate the effects of these industry-based predictability measures on bond ratings further, we examine the incremental effect each variable has on bond rating prediction accuracy.

The predictive capacity increased from the model 1 (56%) to the full model 5 (91%). The other models had the following prediction accuracy rates: model 2 (60%), model 3 (71%) and model 4 (91%). Table 5 compares the prediction accuracies across bond rating classes for the all the models. The benchmark model 1 has a higher predictive capacity for the lower rated bonds (BBB+ and A-) and performs poorly for the higher rated notes (A). Models 2 and 3 shows that bonds issued by an office LPT are more likely to be rated BBB and those issued by retail LPTs rated A-. Further, our full model shows 73% likelihood of the bonds being rated either BBB+ or A-.

Table 5: OR Classification Accuracy of Models 1-5

	BBB+	***A-***	***A***	***Correctly Predicted (%)***
Model 1	22/24 (92%)	21/32 (66%)	0/21 (0%)	56%
Model 2	22/24 (92%)	21/32 (66%)	3/21 (14%)	60%
Model 3	20/24 (83%)	26/32 (81%)	9/21 (43%)	72%
Model 4	22/24 (92%)	30/32 (94%)	18/21 (86%)	91%
Model 5	23/24 (96%)	28/32 (88%)	19/21 (90%)	91%

5.2 ANN

Analysis were done using the five models as defined in section 4.2 on our initial 77 sample which was divided into 54 (70%) as training and 23 (30%) test samples. Results of the model prediction accuracies and variable contribution are shown below.

5.2.1 Prediction Accuracy Analysis

All the models had 96% prediction accuracy for the training sample; see Table 6. The predictive capacity of models increased from 52% (models 1) to 83% (model 5) for the test set emphasising the importance of the inclusion of industry-based variables in the models. The other models had the following results for their test samples: model 2 (61%), model 3 (70%) and model 4 (78%).

Table 6: Summary of ANN Results

Model	*Training Sample*		*Test Sample*	
	No. of Good Predictions	*No. of Bad Predictions*	*No. of Good Predictions*	*No. of Bad Predictions*
Model 1	52(96%)	2(4%)	12(52%)	11(48%)
Model 2	52(96%)	2(4%)	14(61%)	9(39%)
Model 3	52(96%)	2(4%)	16(70%)	7(30%)
Model 4	52(96%)	2(4%)	18(78%)	5(22%)
Model 5	52(96%)	2(4%)	19(83%)	4(17%)

Further Tables 7 shows the classification of accuracy within individual rating categories with highest being for the *A* rating class at 76.2% - 95.2%. This is followed by the *A*- rating class which has a range of 87.5% - 93.8% and finally the BBB+ rating class at 58.3% - 91.7%. These results are comparable to those obtained in OR; see Table 5. ANN predicts better at higher rating classes (A and A-) than at the lower class (BBB+), which is the opposite for OR.

Table 7: ANN Classification Accuracy

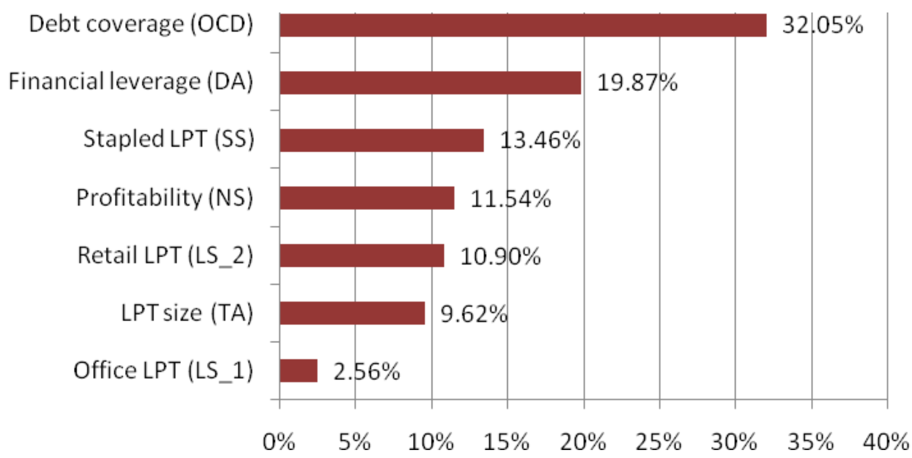
	BBB+	*A-*	*A*	*Correctly Predicted (%)*
Model 1	14/24 (58%)	30/32 (94%)	20/21 (95%)	83%
Model 2	16/24 (67%)	30/32 (94%)	20/21 (95%)	86%
Model 3	22/24 (92%)	30/32 (94%)	16/21 (76%)	88%
Model 4	22/24 (92%)	28/32 (88%)	20/21 (95%)	91%
Model 5	20/24 (83%)	30/32 (94%)	21/21 (100%)	92%

5.2.2 Variable Contribution Analysis

Though earlier literature and publications by credit rating agencies state that financial variables are important in the credit rating of firms and unsecured bonds issued by firms, to the best of our knowledge no study has empirically examined the relative contribution of both financial and industry-based variables in LPT bond rating. This study thus evaluates the relative importance of different factors considered in the LPT bond rating using a neural network model.

Garson (1991) developed a means whereby connection weights within a neural network can be interpreted allowing the effect of various input nodes to be examined and ranked according to their relative importance. This is intrinsically done in Alyuda Forecaster XL®. The results of the relative importance of these variables in our full neural network model (model 5) are shown in Figure 6. We do not show the results of the other four models but suffice to state that the following order of importance was revealed though at various percentages: OCD, DA, NS, SS, LS_2, LS_1 and TA.

Figure 6: LPT Bond Rating Variable Contribution



Our study has shown 27.0% of LPT bond rating is attributable to industry-based variables; office LPT sector (LS_1) accounting for 2.6%, retail LPT (LS_2) 10.9% and stapled management structure (SS) 13.5%. Unlike Gray et al. (2006) who found industry-based variables insignificant in rating Australian firms using probit regression, results of our OR and ANN analysis indicate that industry-based variables are important in determining LPT bond ratings. A possible explanation is that LPTs core business is property investment. Financial variables contribute 73.0% to LPT bond rating, with debt coverage (OCD) being the dominant variable at 32.0%. This is followed by financial leverage (DA: 19.9%), profitability (NS: 11.5%) and LPT size (TA: 9.6%).

One drawback observable from Figure 6 is that no signs are attached to the calculated weights. Thus the interpretation of the relative weights can be inferred from OR analysis.

6. Conclusion, Limitations and Future Directions

The sub-prime mortgage market events in the US have resulted in a 'credit crunch' in the global financial system due to an increased perception of risk on the part of lenders. This has had an impact on the refinancing prospects for maturing LPT bonds and further resulted in no new issuances due to high spreads on securitisable financial receivables and unsecured debt offerings. As such, studies on bond ratings are of great importance for the resuscitation of this source of funding.

This study examines the extent to which various financial and industry variables have on Listed Property Trust (LPT) bond ratings issued by Standard and Poor's from 1999-2006. Ordinal regression (OR) results show that of the financial variables used in our models, debt coverage and financial leverage ratios have the most profound effect on LPT bond ratings. Further, we find industry-based variables of LPT sector and stapled management structure to significantly affect bond rating.

We also examine predictive accuracies of OR and Artificial Neural Networks (ANN) as alternative methods to rating LPT bonds. Empirical analyses indicate that both OR and ANN provide robust alternatives to rating LPT bond and that there are no significant differences in results between the two full models. Inclusion of industry-based variables increases the predictive accuracies of both the OR and ANN models. In addition, ANN results show that 73.0% of LPT bond rating is attributable to financial variables and 27.0% to industry-based variables.

However, before these results can be generalised, field studies need to be conducted to compare the interpretation of the bond-rating process we have obtained from our models with bond-rating experts. Deeper market structure analysis is also needed to fully explain the differences we found in our models.

Further, though our results cannot be viewed as definitive due to the small sample size, the can form a basis for future studies.

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Determinants of Commercial Mortgage-Backed Securities Credit Ratings: Australian Evidence

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Abstract

Using artificial neural networks (ANN) and ordinal regression (OR) as alternative methods to predict Commercial Mortgage-backed Securities (CMBS) credit ratings, we examine the role that various financial and industry-based variables have on CMBS credit ratings issued by Standard and Poor's from 1999-2005. Our OR results show that rating agencies use only a subset of variables they describe or indicate as important to CMBS credit rating as some of the variables they use were statistically insignificant. Overall, ANN show superior results to OR in predicting CMBS credit ratings.

KEYWORDS: Commercial mortgage-backed securities; Credit rating prediction; Ordinal regression; Artificial neural networks

1. Introduction

Commercial mortgage-backed securities (CMBSs) have expanded the investment realm of both investors and issuers. They are seen as an alternative to direct investment in property offering advantages of liquidity, diversification, and being an alternative investment to other financial investments. CMBSs are bonds backed by a single commercial mortgage or, more generally, a pool of commercial mortgages (Jacob & Fabozzi 2003). In Australia, the expansion of the description of CMBSs as a form of securitisation of direct property assets, in addition to traditional definition of the securitisation of mortgages, has gained acceptance in the market (Jones Lang LaSalle 2001). CMBS securities also benefit from the standardised rating agency process that is directly analogous to the corporate bond markets. Corporate bond ratings inform the public of the likelihood of an investor receiving the promised principal and interest payments associated with the bond issue (Shin & Han 2001). However, issues of proprietorship have resulted in the methodology of rating mostly being shrouded in mystery. The methods and input variables used in rating are not fully disclosed to the public (Shin & Han 2001).

Generally, the analysis undertaken by Standard and Poor's (2001), Moody's Investors Service (2003) and Fitch Ratings (2005c) in rating Australian CMBSs falls into three categories: property characteristics and cash flow analysis; portfolio level analysis; and transaction structure analysis, as elaborated in Appendix 1. The Appendix also includes factors considered and their weighting used by ABN AMRO (Roche 2002) in ranking CMBSs. Market yields correspond to bond ratings, which indicate an association between rating and risk. The higher the credit quality the lower will be yield and the more successful will be the issue (Alles 2000; Kose et al. 2003). As such, studies of rating process are of interest not only to bond holders but also to investors.

Although bond rating agencies claim that their ratings reflect each agency's opinion about an issue's potential default risk and rely heavily on a committee's analysis of the issuer's ability and willingness to repay its debt and therefore researchers would not be able to replicate their ratings quantitatively (Kim 2005), researchers have still gone ahead and replicated bond ratings on the premise that the financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). Bond rating studies have traditionally used statistical techniques such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models to capture and model the expertise of the bond rating process. Recently, however, a number of studies have demonstrated that artificial neural networks (ANN) can be used as an alternative methodology to bond rating.

This study investigates several aspects of the use of ANN as a tool for predicting credit ratings of Australian CMBSs. Tests are undertaken to compare the predictive power of ANN models and ordinal regression models. Maher and Sen (1997) show the following as reasons why predictability of credit rating is useful:

- it provides a firm some insight into the cost of going to the bond market to raise capital, which can be useful in comparing with other sources of funds;
- It can help investors decide where they want to place their money;
- It can provide a modified form of implicit evaluation of the firm in addition to the explicit evaluation of the bond issue; and
- An insight into factors consistent with establishing a firm's bond rating is useful in understanding the value of the firm.

Furthermore, security analysts and investors can use these ratings as the primary source of obtaining information about the quality and marketability of various issues and assess also market risk premium attached to the bonds while investment bankers use the ratings for determining commission rates on undertakings (Kim 2005).

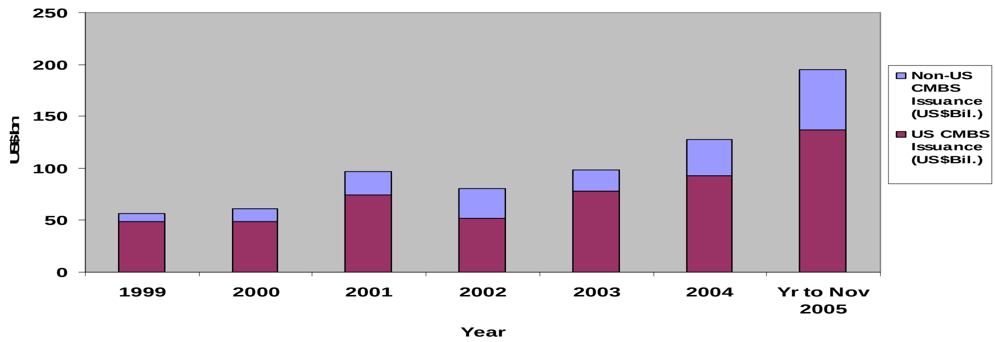
The paper is structured as follows. Section 2 reviews literature on the use of ANNs in various real estate applications and corporate bond rating studies respectively. Section 3 discusses the data and methodology. Section 4 presents the empirical results and analysis. Section 5 concludes and highlights future research direction.

2. An Overview of the Australian Commercial Mortgage-Backed Securities Market

The Australian CMBS market has undergone significant development since the first transactions came to the market in 1999, with a range of transaction types and issuers now accessing the market. The first CMBSs in Australia were done by Leda Holdings in 1999, the Longreach/Qantas head office securitisation and the David Jones flagship stores deals in 2000. As at the end of 2005 a total of 55 CMBSs had been issued with 137 tranches.

On the whole, global issuance of CMBSs has been on the increase with the USA leading the way. From 1999 to November 2005, CMBSs totalling US$532 billion had been issued in the USA compared to US$184 billion for the rest of the world during the same period as depicted in figure 1. There has also been an increase in the financing of commercial property through capital markets. Industry data show that in 2005 issuance of commercial CMBS in the United States was around US$170 billion, an 82 per cent increase over the previous year. Strong activity is also evident in Europe, where around US$56 billion of CMBS were issued in 2005, with around three quarters of this amount issued in the United Kingdom. In 2005, A$2.29 billion of newly rated notes were issued in Australia, an increase of 8.03% on the previous year.

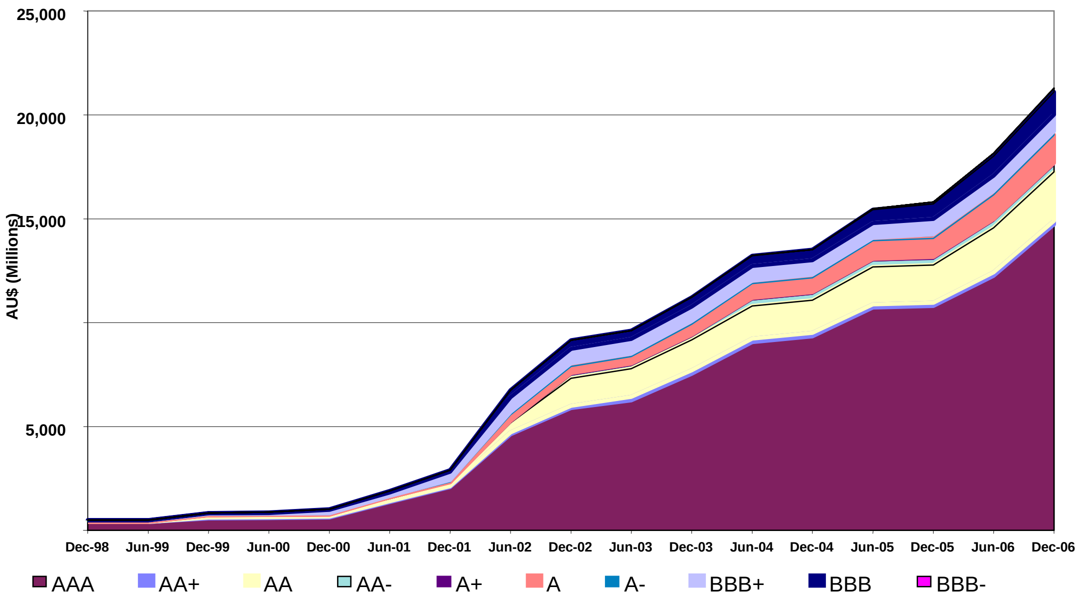
Figure 1: CMBS Global Issuance (January 1999-November 2005)



Source: Author's compilation from Commercial Mortgage Alert

The total cumulative Australian and New Zealand CMBS issuance volume since 1999 had reached A$12.6 billion as shown in figure 2 below (Standard & Poor's 2007c). Total notes outstanding as at the end of 2005 was A$10.496 billion, arising from 16 credit lease and 31 CMBS transactions. Table 1 shows the number of tranches by sector issued from 1999-2005. With the overall Australian securitisation market approaching A$200 billion in debts outstanding, CMBS is still a relatively small asset class. Nevertheless, it remains both an important financing tool for commercial property owners and an alternative source of diversification for fixed income-investors. Appendix 2 shows some of the CMBSs issue by deal type and size.

Figure 2: Cumulative CMBS Issuance: Australia/New Zealand



Source: Standard and Poor's (2007)

Table 1: Number of Australian CMBS Issues by Sector (2000-2005)

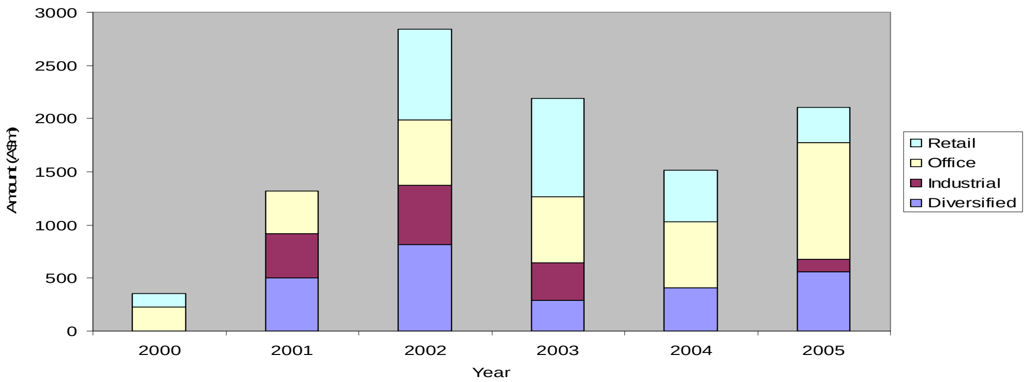
Sector	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2000-2005*
Diversified	1	2	11	7	7	14	42
Industrial	4	3	6	12	4	3	32
Office	0	3	4	5	9	10	31
Retail	0	0	15	9	0	8	32
Total	5	8	36	33	20	35	137

Source: Author's compilation from Standard and Poor's presale reports

Majority of the issues are in the single borrower multi-property category with over 95% of the total issuance to date. The CPIT 2006 Aurora Bonds CMBS is the only one single borrower single-property issuance to date. Two multi-borrower multi-property issues have been by MCS Capital Pty Limited and Challenger Capital Markets Ltd. ALE Finance Company Pty Ltd - Series 1 issuance is the only whole-business CMBS to date. The diversity of issuance transaction types show the maturity of the market as well as the arranger's confidence in trying out various CMBS structures to suit market needs.

However, as at the end of 2005 conduit-style CMBSs from large loans securitised in conduit programs which are common in the USA and Europe had not yet been undertaken in Australia. Conduit CMBSs are backed by reasonably large well diversified pools of small-to medium-sized secured property loans. A lot of the commercial mortgages continued to sit on bank balance sheets, and there was limited interest in pursuing securitisation of these assets. Since 2000, the most dominant CMBS issues have been in the office sector (A$3.6 billion), followed by the retail sector (A$2.7 billion). The diversified sector and the industrial sector have had A$2.6 billion and A$1.4 billion worth of CMBS issuance respectively. This is shown is figure 2.

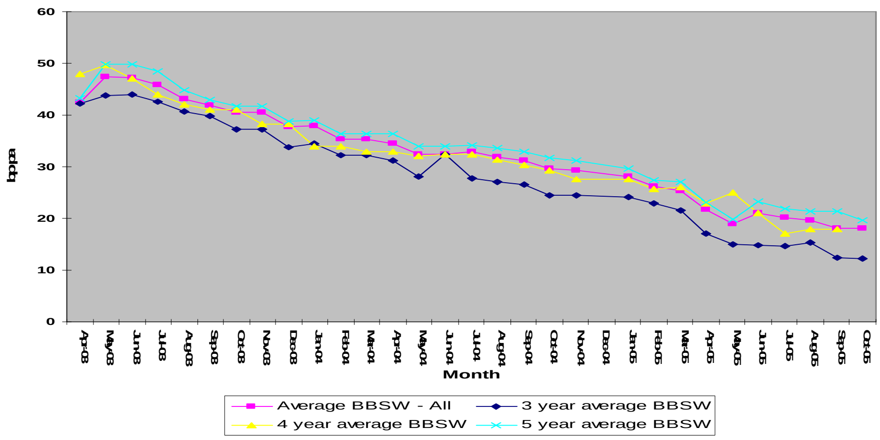
Figure 3: Australian CMBS Issuance by Sector (1999-2005)



Source: Author's compilation from Standard and Poor's presale reports

Given the general appetite for fixed-income securities and the limited supply in the market, CMBS credit spreads have been contracting as shown in figure 4 below. In 2005 'AAA' five-year, interest only notes were priced at 20-25 bps (basis points) over three months' bank bill swap (BBSW), and three-year, interest-only notes at 17-20 bps over three-month BBSW. 'BBB' were priced at 60-95 bps over BBSW. These margins were lower than those of 2002, when they priced at least 20 bps wider for 'AAA' and 60 bps wider at 'BBB' level.

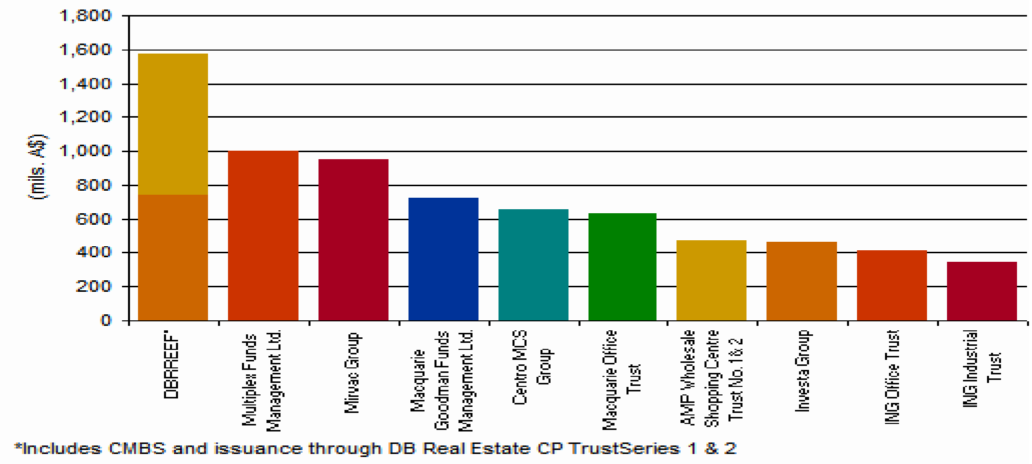
Figure 4: AAA Rated CMBS - Average Industrial Spread to Swap (Apr 2003- Oct 2005)



Source: Author's compilation from Property Australia magazine

Figure 5 shows the top 10 Australian CMBS issuers, all of which are Listed Property Trusts (LPTs). LPTs have a 65% market share. The single-purpose-vehicle-like characteristics of LPTs have helped in their establishment as major players in the CMBS market. Between 2001 and 2004, LPTs issued CMBSs worth over \$3.7B via 27 issues (eg: Mirvac, Macquarie Goodman Industrial, ING Office, ING Industrial, Investa, Macquarie Office) and bonds worth over \$4.8B via 40 issues (eg: Gandel, Commonwealth Property, GPT, Stockland, Westfield) (Newell 2005). This increased participation can partly be attributed to the high demand by institutional investors, mainly superannuation funds, for shares and bonds issued by LPTs in comparison to investing in direct property. The total contribution of asset allocation by Australian superannuation funds to property (both direct and indirect) declined from 17% in 1988 to 9% in 2000-2002, though the contribution of indirect property increased from 3% to 7% over the same period (InTech 2003). In 2005, 95% of superannuation funds had a specific allocation to property (either direct or indirect) averaging 10% (Newell 2006b). With the drop in public bond issuance, bonds and CMBSs issued by LPT have been an attractive investment option for superannuation funds.

Figure 5: Top 10 Australian CMBS Issuers



Source: Standard and Poor's (2005).

The macroeconomic outlook for the Australian market remains benign, with historically low unemployment rates and a low interest environment expected to continue. These stable economic conditions are expected to foster resilience in the supply of securitisable financial receivables.

3. Prior Research in Artificial Neural Network Systems

ANNs are trainable analytical tools that attempt to mimic information processing patterns in the human brain. They are applied to a wide variety of pattern matching, classification, and prediction problems and are useful in many financial applications such as: stock price prediction, development of security trading systems, modelling foreign exchange markets, prediction of bond ratings, forecasting financial distress, and credit fraud detection and prevention. Comprehensive reviews of articles demonstrating the use of ANNs in various finance situations can be found in Fadlalla and Lin (2001), Coakley and Brown (2000), and Krishnaswamy et al. (2000).

Neural networks are regarded by many authoritative commentators as a useful addition to standard statistical techniques, and are in fact themselves based on statistical principles. Frequently these studies are in form of comparative analysis, with researchers contrasting the findings and perceived efficiency of ANNs with more tried and tested statistical methods. Although Salchenberger et al. (1992) and Tam and Kiang (1992) state that ANNs have several advantages over statistical methods, the results of these studies were less than expected because the real data in application is usually unevenly distributed among classes and these applications are limited in dealing with the ordinal nature of bond rating. Unlike statistical models, a neural network does not require priori specification of a function form, but rather attempts to learn from training input-output examples alone.

3.1 Artificial Neural Network Systems in Real Estate Research

ANN has recently earned a popular following amongst real estate researchers covering aspects such as real estate valuation: Tay and Ho (1991), Evans and Collins (1992), Worzala et al. (1995); Kauko (2004); examination of the impact of age on house values: Do and Grudnitski (1992), prediction of house value: McGreal et al. (1998), Nguyen and Cripps (2001) and Lai (2005); forecasting commercial property values: Connellan and James (1998a) and Connellan and James (1998b); and the impact of environmental characteristics on real estate prices: Kauko (2003).

McGreal et al. (1998), Nguyen and Cripps (2001), and Lai (2005); all demonstrated the superiority of ANN over MRA in predicting house values. Worzala et al. (1995) and Lenk et al. (1997), however, noted that ANNs where not necessarily superior. Connellan and James (1998b) also show the superiority of ANNs over MRA in predicting commercial property values.

The increased use of neural networks by academic and commercial analysts in real estate studies is motivated by their recognition of complex patterns of multivariate property data (Connellan & James 1998a). This increased use of ANN methodology in the commercial real estate research gives credence to its extension to research in predicting CMBS bond ratings.

3.2 Artificial Neural Network Systems in Corporate Bond Rating Research

Bond ratings are subjective opinions on the likelihood of an investor receiving the promised interest and principal payments associated with bond issues. They are published by bond rating agencies such as Moody’s Investor Service, Standard and Poor’s, and Fitch Ratings, in the form of a letter code, ranging from AAA-for excellent financial strength-to D for entities in default.

Rating agencies and some researchers have emphasized the importance of subjective judgement in the bond rating process and criticized the use of simple statistical models and other models derived from artificial intelligence to predict credit ratings, although they agree that such analysis provide a basic ground from judgement in general (Huang et al. 2004). Qualitative judgement, which includes accounting quality, operating efficiency, financial flexibility, industry risk, and market position, is still difficult to measure though. Literature on bond rating prediction has demonstrated that statistical models and artificial intelligence models (mainly neural networks) achieved remarkably good prediction performance and largely captured the characteristics of the bond rating process.

In this sense, various quantitative methods have been applied to bond rating. Statistical methods such as multivariate discriminant analysis (MDA), multiple regression analysis (MRA), probit and logit models have been used in order to capture and model the expertise of the bond rating process.

Several studies show that ANNs can be applied to bond rating: Dutta and Shekhar (1988), Surkan and Singleton (1990), Maher and Sen (1997), Kwon et al. (1997), Daniels and Kamp (1999), Chaveesuk et al. (1999), Yesilyaprak (2004), Huang et al. (2004), and Kim (2005).

Dutta and Shekhar (1988) were the first to investigate the ability of neural networks (NNs) to bond rating. Their sample comprised bonds issued by 47 companies randomly selected from the April 1986 issues of Value Line Index and the Standard and Poor’s Bond Guide. They obtained a very high accuracy of 83.3% in discerning AA from non-AA rated bonds. However, the sample was so small that it simply amounted to showing the applicability of neural networks to bond rating.

Surkan and Singleton (1990) also investigated the bond rating abilities of neural networks and linear models. They used MDA, and found that NNs outperformed the linear model for bond rating application.

Maher and Sen (1997) compared the performance of neural networks with that of logistic regression. NN performed better than a traditional logistic regression model. The best performance of the model was 70% (42 out of 60 samples).

Kwon et al. (1997) compared the predictive performance of ordinal pairwise partitioning approach to back propagation neural networks, conventional (CNN) modelling approach and MDA. They used 2365 Korean bond-rating data and demonstrated that NNs with OPP had the highest accuracy (71-73%), followed by CNN (66-67%) and MDA (58-61%).

Chaveesuk et al. (1999) compared the predictive power of three NN paradigms- back propagation (BP), radial basis function (RBF) and learning vector quantisation (LVQ)- with logistic regression models (LRM). Bond issues of 90 companies were randomly selected from the 1997 issues listed by Standard and Poor's. LVQ (36.7%) and RBF (38.3%) had inferior results to BP (51.9%) and LRM (53.3%). BP only performed slightly better than LRM. They concluded came that assignment of bond ratings is one area that is better performed by experienced and specialised experts since neither NN nor LRM produced accurate results.

Daniels and Kamp (1999) modelled the classification of bond rating using NN with one hidden layer; and a linear model using ordinary least squares. Financial figures on bonds issued by 256 companies were selected from Standard and Poor's DataStream. The percentage of correct classification ranged from 60-76% for NN and 48-61% for OLS.

Yesilyaprak (2004) compared ANNs and MDA and multinomial logit (ML) techniques for predicting 921 bonds issued by electric utility (367), gas (259), telephone (110) and manufacturing companies (185). ANNs (57 – 73 %) performed better than both MDA (46 – 67 %) and ML (46 – 68 %) in predicting the bond rating in three samples. ML (68 %) performed better in predicting the bond rating (in one sample (electric utility).

Huang et al. (2004) compared back propagation neural networks and vector support machine learning techniques for bond rating in Taiwan and the United States. The data set used in this study was prepared from Standard and Poor's CompuStat financial data. They obtained a prediction accuracy of 80%.

Kim (2005) used an adaptive learning network (ALN) on a sample of 1080 observations (companies) primarily collected from the CMPUTSTAT database, Dun and Bradstreet database, and Standard and Poor's bond manuals to predict their rating. The overall performance of the model shows that the trained ALN model was successful in predicting 228 (84%) out of 272 cases. The further showed a prediction accuracy of 88% and 91% for investment grade and speculative bonds respectively.

In summary, most studies on ANNs showed promising results than those of other classification methods. The current study attempts to extend the use of ANNs to predict ratings on CMBSs. The predictive capacity of ANNs is further compared to that of OR.

4. Methodology and Data

4.1 Hypotheses

In this paper we hypothesise that loan-to-value ratio (LTV) is negatively related to CMBS credit rating whereas debt-to-service coverage ratio (DSCR) is positively related. The incidence of default rises with increase in LTV; that is, if all other factors are held constant, the probability of default for a loan increases as the LTV increases, but not equal. Unlike the LTV, where the probability of default increases as the LTV rises, the incidence of default is a decreasing function of the DSCR. However, the relationship between the DSCR and the probability of default is weaker than the relationship between the LTV and default. Our motivation for the specified hypothesis stems from Fabozzi and Jacob (1997) and Geltner and Miller (2001), among others, who state that LTV and DSCR are the two mostly widely used commercial mortgage underwriting criteria. Descriptions of LTV and DSCR are found in Section 4.5

We further hypothesise that CMBS issues with a well diversified portfolio both on a property composition and geographic location basis will attract higher credit ratings. The diversity of a portfolio of assets will have an impact on the volatility of the pool's expected loss. By diversifying the mix and location of property, one can mitigate a pool's expected losses. Property diversity mitigates the risk of fall in asset value of the single largest property in the pool. Geographic diversity mitigates the risk single market decline and may reduce any losses associated with this type of risk. In support of our hypotheses, Moody's Investor Service (2003) asserts that CMBS deals also benefit from portfolio diversification.

Additional hypotheses are that size of issue and note tenure are positively and negatively related to the success of bond issues respectively. Larger bond issues are done by bigger firms with strong track records who fall under stricter regulatory regimes such as the Australian Securities and Investment Commission and the Managed Investment Scheme provisions of the Corporations Act 2001, among others, should attract higher credit ratings. Longer note tenures increase the incidence of default and should therefore attract lower credit ratings.

To test the hypotheses, ordinal regressions are applied to the CMBS sample whereas prediction of accuracy in bond rating for ANN evaluates their contribution to the model.

4.2 Description of OR Model

There is a general consensus on the inappropriateness of least squares methods to rate bonds as they ignore their ordinal nature (Kamstra et al. 2001). OR has been considered appropriate as it accommodates the ordinal nature of the bond rating in the analysis.

The model is similar to the general multiple linear regression model but defines Y_i and estimates β differently.

The logistic model computes the probabilities that an observation will fall into each of the various rating categories. The observation is classified into the category with the highest probability. This probability is estimated by the logistic model as:

$$\log it\,(p_i) = \log\left[\frac{p_i}{1-p_i}\right]$$

$$= \beta_0 + \beta_1\ X_{i1} + \beta_2\ X_{i2} + \ldots\ldots\ \beta_n\ X_{in} \qquad (1)$$

where

r = bond rating category;

p_i = $P\ (Y_i = r);$

i = 1…n, where n is the sample size; and

$X_{i1,\ldots,}\ X_{in}$ are predictor variables.

The βs are estimated by maximising the log-likelihood function:

$$\sum_{i=1}^{N} P(\beta; Y_i) = \sum_i \ln\left(\frac{1}{1-e^{-\beta X_i}}\right) \qquad (2)$$

where β is the vector of the parameters to be estimated. Once β's are estimated, p_i is estimated by

$$p_i = \frac{1}{1+e^{-\beta X_i}} \qquad (3)$$

The observation is assigned to the bond rating category with the highest predicted probability. These predictions are compared to the actual bond rating assigned to the issue to calculate classification accuracy for the model.

The observed value on Y_i depends on whether or not a particular threshold has been crossed.

Y_i = BBB if Y_i^* is ≤ β_1

Y_i = A if $\beta_1 \leq Y_i^* \leq \beta_2$

Y_i = AA if $\beta_2 \leq Y_i^* \leq \beta_3$

Y_i = AAA if $Y_i^* \geq \beta_3$

OR regressions were where carried out in SPSS® version 13.0 (SPSS Inc. 1968)

4.3 Description of ANN Model

This subsection contains a gentle introduction to the fundamental theory of ANN. Consider the following model:

$$y_t = g(x_t;\theta) + \varepsilon_t \tag{4}$$

where $g(\bullet)$ denotes a continuous differentiable function, x_t is a $k \times 1$ vector of explanatory variables, which could include the lagged dependent variables, y_{t-i} for some i, θ is a $l \times 1$ vector of parameter and ε_t is a sequence of independently, identically distributed random variables. In general, the explicit function form of g is unknown. However, it is possible to find a universal approximator, so that the function g can be estimated as accurately as one wish. One such approximator is

$$F(x_t;\gamma) = \phi_0 + \sum_{i=1}^{q} \beta_i G(x_t;\gamma_i) \tag{5}$$

where

$$G(z;\nu,c) = \frac{1}{1+\exp(-\nu[z-c])} \tag{6}$$

is the well known logistic function. (Hornik et al. 1989, 1990) (see also (Cybenko 1989a), (Carroll S.M. & B.W. Dickinson 1989), (Funabashi 1989)) showed that for any continuous function $g(x_t;\theta)$, every compact subset K of $\mathbb{R}^k$ and every $\delta > 0$, there exists a $F(x_t;\gamma)$ such that

$$\sup_{x \in K} \| F(x_t;\gamma) - g(x_t;\theta) \| < \delta \tag{7}$$

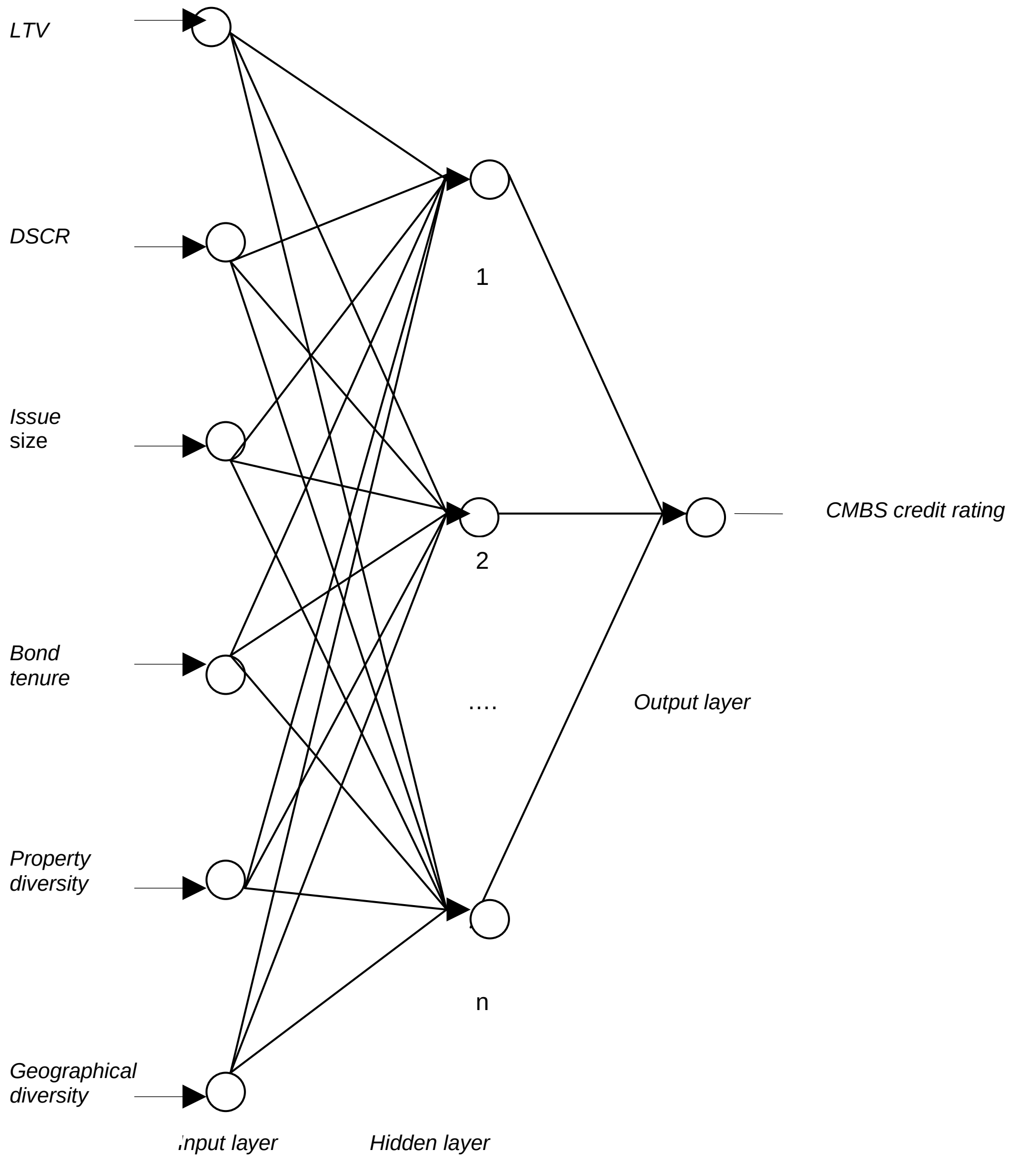
Following these results, it is straightforward to show that the accuracy of the approximation is determined by the number of hidden layer units, namely, q and the parameter vector γ, given a set of k inputs, namely, the $k \times 1$ vector x_t. The choice of q can be somewhat arbitrary, it is often a matter of striking a balance between accuracy and over-fitting. Given q, the parameter vector γ can be estimated using non-linear least squares:

$$\hat{\gamma} = \arg\min_{\gamma \in \Lambda} \sum_{t=1}^{T} (y_t - F(x_t;\gamma))^2 \tag{8}$$

Obviously, the computational complexity of this minimisation problem grows as the number of hidden layer units grows. Several studies (See (Weeraprajak 2007) for a comprehensive review) have suggested that the computational burden can be reduced if it is possible to separate the function $F(\bullet)$ into linear and non-linear components. In this case, the parameters associated with the linear component can be estimated using conventional least squares estimator, which has a closed form solution and the parameters in the non-linear component can be estimated using the non-linear least squares estimator. This implies the number of parameters required to be estimated by the non-linear estimator is reduced and hence improve computation efficiency.

The graphical representation of the basic ANN model with the three primary components, namely the input layer (the input/explanatory variables, x_t), the hidden layer (black box) with multiple units, $G(x_t, \gamma_i)$ and the output measure layer (the estimated CMBS rating in this case) can be found in Figure 6:

Figure 6 Structure of a CMBS rating neural network



The hidden layer(s) contain two processes: the weighted summation function (the linear component); and the transformation function (the nonlinear component). Both of these functions relate the values from the input data (e.g. LTV; DSCR; issue size; bond tenure, property diversity, geographical diversity) to output measures (CMBS rating).

Alyuda Forecaster XL® (2001) was used for the ANN experimentation. In the case of our 6 input and 4 output network, the hidden units where automatically set at 29 (model 1), 28 (model 2) and 23 (Model 3).

4.4 Data

Based on Standard and Poor's Ratings Direct database, our dataset comprised all the CMBSs issued between July 1999 and December 2005 totalling 55. The issues had a combined total of 137 tranches and ratings ranging from AAA, AA, A, BBB+, BBB, BBB- , to NR. In this study, all A and BBB rated tranches were grouped into two groups that is A-rated and BBB-rated respectively. The reclassification of tranches into four classes could enhance model performance because mathematical and statistical approaches have general limits in dealing with ordinal nature of bond rating. It known that as the number of bond classification increases, the predictive power could likely decrease (Kwon et al. 1997).

We further excluded unrated tranches, to leave us with 118 tranches (training sample) and 17 tranches (test sample) respectively. Zhang et al.(1998) indicate that literature offers little guidance in selecting the training and test samples, with most authors selecting them based on the rule of 90% vs. 10%, 80% vs. 20% or 70% vs. 30%, etc. They emphasise that the critical issue is to have both the training and the test sets representative of the population or underlying mechanism. The division of training and test sets should depend on the problem characteristics, the data type and the size of the available data. Details of the individual rating categories in each sample are shown in Table 2.

Table 2: Observations per CMBS Rating

Rating	Training Sample		Test Sample	
	Count	Proportion	Count	Proportion
A	17	14%	4	23%
AA	25	21%	3	18%
AAA	62	53%	3	18%
BBB	14	12%	7	41%
Total	118	100%	17	100%

Descriptive statistics of the data used in the experiments is shown in Table 3.

Table 3: Descriptive Statistics

Training Sample

	Issued Amount (A$m)	Bond Tenure (Years)	DSCR**	LTV**	Property Diversity	Geographical Diversity
Mean	79.87	3.97	2.14	0.46	0.29	0.48
Standard Error	7.36	0.12	0.05	0.01	0.02	0.01
Standard Deviation	79.90	1.31	0.51	0.10	0.18	0.15
Minimum	1	1	1.28	0.31	0.08	0.2
Maximum	350	7	3.5	0.76	1	1

Test Sample

	Issued Amount (A$m)	Bond Tenure (Years)	DSCR**	LTV**	Property Diversity	Geographical Diversity
Mean	47.59	4.94	1.81	0.48	0.32	0.51
Standard Error	13.33	0.06	0.09	0.02	0.04	0.06
Standard Deviation	54.96	0.24	0.36	0.07	0.18	0.26
Minimum	3	4	1.2	0.36	0.11	0.21
Maximum	190	5	2.7	0.61	0.55	0.78

Appendix 3 provides bivariate training sample correlations that exist between the data items.

4.5 Selection of Variables

Bond rating recognises the following areas of attention: profitability; liquidity; asset protection; indenture provisions; and quality of management. Bond rating models use independent variables, often calculated as ratios, which are predominantly derived from public financial statements. The assumption is that financial variables extracted from public financial statements, such as financial ratios, contain a large amount of information about a company's credit risk (Huang et al. 2004). Financial ratios used relate to leverage, coverage, liquidity, profitability, and size. Financial and property ratios referred to are in appendix 3. Rating agencies list qualitative factors such as management ability, value of intangible assets, financial flexibility, operating efficiency, industry risk, accounting quality and market position. However, most of these qualitative factors are likely reflected in the quantifiable data such as financial and non-financial variables, and could be assessed indirectly from analysing these quantifiable data (Kim 2005).

According to Moody's (2003), the credit risk of CMBSs depends the characteristics of the underlying properties, loan structure, loan-to-value (LTV) ratio and the debt service coverage ratio (DSCR) and portfolio diversification. Standard and Poor's (2001) as well state that their basis of rating is the relative risk of the collateral and the ability of the collateral to generate income. The main criterion used to quickly assess credit risk of CMBS deals are the loan-to-value (LTV) ratio and the debt service coverage ratio (DSCR) (Fabozzi & Jacob 1997). The LTV is calculated by dividing the total amount of the notes issued by the current market value of all the properties. The DSCR is calculated by dividing the total net passing income of the properties by the debt-servicing amount. The debt-servicing amount is derived by multiplying credit rating agencies' stressed interest rate assumption by the notes' issuance amount.

Credit rating agencies establish a stabilised net cash flow and an 'assessed capital value', which are used as the basis of the debt-sizing calculations. The appropriate LTV and DSCR are applied to those values. The capitalisation rate used to determine the 'assessed capital value' is a function of the risk and return of the asset, reflecting its age, quality, location, and competitive position within the market (Standard & Poor's 2004a).

Following Hedander (2005) who used a diversity scoring system based on the Herfindahl Index to measure diversity on a geographic and property type concentration basis in Australian listed property trusts, we adopt a similar procedure to measure diversity in Australian CMBS portfolios. This index effectively converts a pool of issues of uneven size into a measurement of diversity, as if all issues were the same size. A totally focussed CMBS issue has an index equal to one, while the index for a diversified CMBS issue is closer to zero. Appendix 4 shows property and geographical diversity details, among others.

The Herfindahl Geographic Region Index (HHGR) for each respective CMBS issue is calculated as follows:

$$\text{HHGR} = \sum_{j=1}^{8} \left(\frac{x_j}{x}\right)^2 \qquad (9)$$

where j = Geographic region: the states in Australia (New South Wales, Victoria, Queensland, South Australia, Western Australia, Northern Territory, Australian Capital Territory (ACT) and Tasmania,

x_j = Percentage of asset type in portfolio

x = Total portfolio composition

We wish to acknowledge use of other factors in CMBS rating to deal with transaction and legal risk but have not considered them in this study as there are common or standard features that have been set up to mitigate these risks in all issues.

A number of models are used. Model 1 includes LTV and DSCR as independent variables. Model 2 has an addition of bond tenure and the log of issue size to the independent variables in Model 1. Finally, Model 3 has all the independent variables in Models 1 and 2 in addition to portfolio diversification variables. Tranche rating is the dependent variable in all the models.

5. Empirical Results and Analysis-

5.1 OR

The results of the ordinal regression analyses are shown in Table 4. To empirically specify the model, three tests were used: the standard technique of likelihood ratio test, the significance of the individual coefficients, explanatory power (pseudo R-Square) and the accuracy of the predicting rate. From the observed significance levels, only LTV is related to CMBS credit ratings being significant at .05 level of confidence in all three models but with anomalous positive coefficients implying that high LTV ratios command higher credit ratings. A negative coefficient for LTV was hypothesised as higher LTV increase the level of default and result in lower credit ratings. Log of issued amount (SIZELN) had the anticipated positive coefficient sign whereas bond tenure (TENURE) and level of property diversity (PD) had the anticipated negative coefficients. DSCR, TENURE, PD and geographic diversity (GD) appear not be related to the rating being insignificant at .05 level of confidence. This is an interesting finding as prior literature has stipulated that LTV and DSCR are the two main predictors of CMBS default risk (Fabozzi & Jacob 1997). However, recent research by An (2006), Deng et al. (2005) and Grovenstein et al. (2004), among others, find little statistically significant relationship exists between original LTV and DSCR and CMBS default risk, supporting our results. They attribute this to the endogenous nature of original LTV and DSCR to the underwriting process. Lenders frequently respond to higher perceived overall risk (based on a multidimensional analysis including factors other than LTV and DSCR) by limiting the amount they will lend thereby lowering the loan-to-value ratio and increasing the debt service coverage ratio.

The low pseudo R-square in all three models (ranging from 0.018 to 0.039) indicate that there are other factors affecting CMBS bond rating, giving credence to use of other investigative techniques into their rating such as ANN. It should also be noted that addition of variables SIZELN and TENURE (model 2) to the basic model of DSCR and LTV increased the predictive power from 0.018 to 0.033. The full model with all the variables (model 3) showed an over double increase in the predictive power (0.018 to 0.039) over the basic model though there was a marginal increase over model 2 (0.033 to 0.039).

The inclusion of additional variables to the basic model increased chi-square from 7.036 (model 1) to 9.778 and 11.495 (model 2 and 3) respectively though significance levels decreased. Models 1 and 2 chi-square were significant at the 0.05 level and model 3 at the 0.10 level.

These results imply that rating agencies use only a subset of variables they describe or indicate as important to CMBS rating. Further, the suggested variables do not generally (with exception of LTV and to some extent DSCR) discriminate among credit ratings. This is exemplified by figures 1 to 6 in Appendix 5. There is a strong relationship between CMBS rating and LTV, whereas a weak relationship exists with DSCR. The other variables show no relationship to CMBS rating.

Table 4: OR Results

Variable (Expected Sign)	*Model 1*			*Model 2*			*Model 3*		
A	1.980	(0.310)	[1.031]	3.861	(0.100)	[2.700]	4.115	(0.088)	[2.914]
AA	3.053	(0.118)	[1.952]	4.959	(0.035)	[4.428]	5.221	(0.031)	[4.664]
AAA	5.515	(0.006)	[2.006]	7.481	(0.002)	[9.545]	7.757	(0.002)	[9.768]
DSCR (+)	0.471	(0.321)	[0.983]	0.622	(0.207)	[1.593]	0.801	(0.122)	[2.393]
LTV (-)	6.268	(0.011)	[6.548]	8.307	(0.003)	[9.004]	9.512	(0.001)	[10.401]
SIZELN (+)				0.590	(0.122)	[0.331]	0.693	(0.077)	[3.130]
TENURE (-)				-0.079	(0.565)	[2.394]	-0.087	(0.553)	[0.353]
PD (-)							-1.255	(0.230)	[1.438]
GD (+)							-0.949	(0.446)	[0.580]
Chi-Square	7.036	(0.030)		9.778	(0.044)		11.495	(0.074)	
*Pseudo R-Square	0.018			0.033			0.039		

*We utilise McFadden's pseudo R-Square based on Ederington (1985) who recommend it as being the most attractive intuitively as well as theoretically of all others. Regression coefficients provided with significance levels (in parenthesis) and Wald chi-square [in brackets].

Table 5 shows the number of ratings correctly predicted. The best results was obtained by model 3 which included all the variables at 53% (63 out of 118 cases) followed by models 1 and 2 at 52% (61 out of 118 cases) each.

Table 5: OR Classification Accuracy of Models 1-3

Model 1

Actual CMBS Rating	*Predicted CMBS Rating*		
	AAA	BBB	*Total*
A	17	0	17
AA	23	0	23
AAA	59	0	59
BBB	17	2	19
Total	116	2	118

Model 2

Actual CMBS Rating	*Predicted CMBS Rating*		
	AAA	BBB	*Total*
A	17	0	17
AA	23	0	23
AAA	58	1	59
BBB	16	3	19
Total	114	4	118

Model 3

Actual CMBS Rating	*Predicted CMBS Rating*		
	AAA	BBB	*Total*
A	17	0	17
AA	23	0	23
AAA	59	0	59
BBB	15	4	19
Total	114	4	118

The log-likelihood test in this case failed as the estimation of the general model failed to converge. Subsequently we do not believe the test is valid in this case, leading us to conclude that statistical approaches used in corporate bond rating studies have limited replication capabilities in predicting CMBS credit ratings.

5.0 ANN

5.2.1 Prediction Accuracy Analysis

As pointed out in section 4.5 and following the approach taken to test the explanatory power of OR models to predict credit ratings by composing models with various independent variables, the same approach was adopted using ANN. Three models were run starting with the basic model with two independent variables being LTV and DSCR. Some researchers (Fabozzi & Jacob 1997) and rating agencies (Moody's Investor Service 2003) regard these as the most important variables in determine a CMBS credit rating. The second model included bond tenure (TENURE) and log of issue size to the independent variables in Model 1. Finally, Model 3 had all the independent variables used in Models 1 and 2 in addition to portfolio diversity variables. Tranche rating is the dependent variable in all the models.

The predictive capacity of ANNs decreased from 93% (models 1 and 2) to 91% (model 3) for the training set and test and increased from 70% (model 1) to 80% (model 2 and 3) for the test set as shown in Table 6. Further Tables 7 shows the classification of accuracy within individual rating categories. Appendix 6 shows the error distribution.

Table 6: Summary of ANN Results

Model	*Training Sample*		*Test Sample*	
	No. of Good Predictions	*No. of Bad Predictions*	*No. of Good Predictions*	*No. of Bad Predictions*
Model 1	93(95%)	5(5%)	14(70%	6(30%)
Model 2	93(95%)	5(5%)	16(80%)	4(20%)
Model 3	91(93%)	7(7%)	16(80%)	4(20%)

Table 7: ANN Classification Accuracy

Model 1

Actual CMBS Rating	*Predicted CMBS Rating*			
	AAA	AA	A	BBB
AAA	55	3	1	0
AA	0	22	1	0
A	1	5	11	0
BBB	0	0	0	19

Model 2

Actual CMBS Rating	*Predicted CMBS Rating*			
	AAA	AA	A	BBB
AAA	59	0	0	0
AA	2	21	0	0
A	1	3	11	2
BBB	1	0	0	18

Model 3

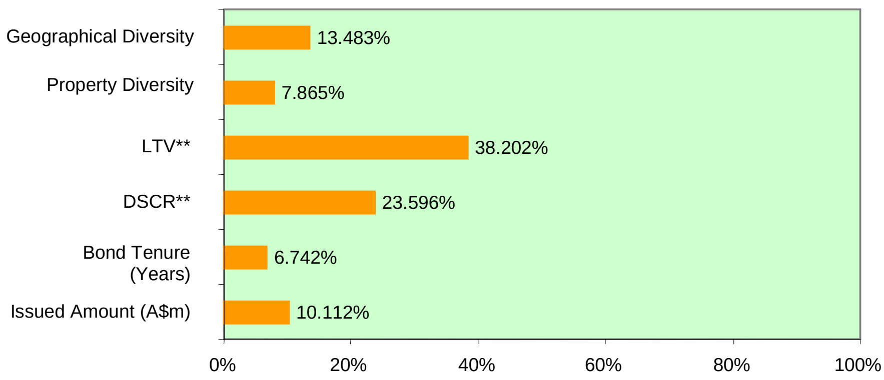
Actual CMBS Rating	*Predicted CMBS Rating*			
	AAA	AA	A	BBB
AAA	57	0	2	0
AA	1	20	2	0
A	1	3	12	1
BBB	1	0	0	18

5.2.2 Variable Contribution Analysis

Though earlier literature and publications by credit rating agencies state that LTV and DCSR are important property ratios which impact on the achievable credit rating for a CMBS issue, to the best of our knowledge no study has empirically examined the relative contribution of each of these input parameters to a CMBS rating. This study thus evaluates the relative importance of different factors considered in the CMBS rating using a neural network model.

The results of the relative importance of these variables in our full neural network model (model 3) are shown in Figure 7. We do not show the results of the other two models but suffice to state that the following order of importance was revealed though at various percentages: LTV, DSCR, Issued Amount and Bond Tenure.

Figure 7: CMBS Rating Variable Contribution



Our study has shown 62% of CMBS rating is attributable to LTV (38.2%) and DSCR (23.6%); supporting earlier studies which have listed the two as being the most important variables in CMBS rating. The other variables contributions are: CMBS issue size 10.1%; and CMBS tenure 6.7%, geographic diversity 13.5% and property diversity 7.9% respectively.

Our results are comparable to those stated in the ABN AMRO CMBS Ranking Model. Under the model all the property-based factors added up to 75% (asset quality (15%); refinancing risk (20%); lease expiry profile (15%); credit quality of income (15%) and tenancy concentration (10%). All these factors are captured by LTV and DSCR in our model, which have a combined total weighting of 62%. In our model, diversification accounted for 21% whereas the ABN AMRO model had 15%. Differences between our model and the ABN AMRO model with the remaining factors makes difficult to complete the comparisons comprehensively. Our model captures bond tenure and amount issued. The ABN AMRO model captures management experience and growth strategy.

One drawback observable from Figure 2 is that no signs are attached to the calculated weights. Thus the interpretation of the relative weights can be inferred from OR analysis.

6. Conclusion, Limitations and Future Directions

Superior predictive results were obtained from the ANN analysis in comparison to OR. ANN correctly predicted 95% and 91% CMBS rating for the training and test sets respectively whereas OR had 52-53% for the training set across the three models, confirming results obtained in earlier studies on predicting corporate bond rating using the two methodologies. Further, ANNs offer better results classifying across rating classes, while OR perform better only at the AAA class level and perform poorly for lower classes.

While our study has empirically tested variables propagated by credit rating agencies as being important to CMBS rating and found all but LTV to statistically insignificant using OR, we conclude that statistical approaches used in corporate bond rating studies have limited replication capabilities in CMBS rating and that the endogeneity arguments raise significant questions about LTV and DSCR as convenient, short-cut measures of CMBS default risk. However, ANNs do offer promising predictive results and can be used to facilitate implementation of survey-based CMBS rating systems. This should contribute to making the CMBS rating methodology become more explicit which is advantageous in that both CMBS investors and issuers are provided with greater information and faith in the investment.

However, before these results can be generalised, field studies need to be conducted to compare the interpretation of the bond-rating process we have obtained from our models with bond-rating experts. Deeper market structure analysis is also needed to fully explain the differences we found in our models. Further still, though our results cannot be viewed as definitive due to the small sample size, the can form a basis for future studies. Over time with more CMBS issuances, a larger sample size will enable analysis of various issues backed by different property classes to check for differences, if any.

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Appendix 1 Factors Considered in Rating Australian CMBSs

Moody's *CMBS Rating Approach*[1]	***Standard and Poor's CMBS Rating Approach*[2]**	***Fitch Ratings CMBS Rating Approach*[3]**	***ABN AMRO CMBS Ranking Model*[4]**
▪ *Property Characteristics Analysis* -Sustainable cash flow -Quality grade -Property type -Tenant quality ▪ *Loan Structure Analysis* -Amortisation profile -Floating rate loans -Seasoning and Delinquencies -Cross-Collateralisation and Cross-Defaulting -Other loan features ▪ *Loan-to-Value and Debt-Service Coverage Ratios Analysis* -Current, Balloon and Target LTV -Actual and Hurdle DSCR ▪ *Portfolio Level Analysis* -Portfolio diversification -Other overall considerations (legal environment, quality of service, liquidity, tail periods, commingling risk, insurances)	▪ *Property Based Analysis* -Location -Tenancy (tenant profile, lease maturity risk) -Lease -Market rental rates and expenses -Building quality assessment -Supply and demand considerations -Management ▪ *Transaction Structure Analysis* -Term of debt - Amortisation profile - Hedging strategy -Cash trap mechanisms	• *Rating Analysis* ▪ Quantitative Analysis -Adjustment to Net Operating Income (rent recognition, vacancy, other income, management fee, real estate taxes, insurance) -Capital items consideration (leasing costs, replacement reserves) -Interest rate adjustment (mortgage constant to reflect long-term conventional financing) -Debt Service Coverage Ratio -Loan-to-Value Ratio -Amortisation credit ▪ Qualitative Analysis -Sponsor/manager's track record -Overleverage and Subordinate Debt -Collateral quality (location, access and visibility; design and construction quality; tenant quality; economic and market trends; leaseholds -Environmental issues -Pool-related adjustments (loan and geographic diversity) • *Structural Issues* -Balloon payments -Liquidity -Servicer's experience -Cross-Collateralisation and Cross-Default	▪ *Asset Quality (15%)* -Location -Age -Condition -Tenant retention ▪ *Refinancing Risk 20%)* -Refinancing risk -Ownership structure ▪ *Leasing Expiry Profile (15%)* -Percentage of lease expiring over debt term -Amount of future cash flow to amortise debt ▪ *Management (10%)* -Track record -Growth strategy ▪ *Tenancy Concentration (10%)* -Credit worthy of tenant -Lease profile ▪ *Number of Assets in Pool (15%)* -Diversification -Number of assets in pool

	-Control of property cash flow -Property releases -Low Debt Service Reserve -Management replacement -Insurance coverage • *Legal Features* -Special-purpose entity -Representations and Warranties

Sources:

2. Moody's Investor Service (2003).
3. Standard and Poor's (2001).
4. Fitch Ratings (2005).
5. Roche (2002).

Appendix 2: Training Sample Correlations

Variable		*Issued Amount (A$m)*	*Bond Tenure (Years)*	*DSCR***	*LTV***	*Property Diversity*	*Geographical Diversity*	*Rating**
Issued Amount (A$m)	Pearson Correlation	1	.037	.236(**)	-.465(**)	.025	-.089	.505(**)
	Sig. (2-tailed)		.673	.006	.000	.777	.307	.000
Bond Tenure (Years)	Pearson Correlation	.037	1	.070	.037	.108	-.216(*)	.030
	Sig. (2-tailed)	.673		.420	.666	.211	.012	.727
*DSCR***	Pearson Correlation	.236(**)	.070	1	-.689(**)	-.146	-.042	.669(**)
	Sig. (2-tailed)	.006	.420		.000	.090	.626	.000
*LTV***	Pearson Correlation	-.465(**)	.037	-.689(**)	1	.203(*)	.073	-.861(**)
	Sig. (2-tailed)	.000	.666	.000		.018	.401	.000
Property Diversity	Pearson Correlation	.025	.108	-.146	.203(*)	1	.194(*)	-.138
	Sig. (2-tailed)	.777	.211	.090	.018		.024	.112
Geographical Diversity	Pearson Correlation	-.089	-.216(*)	-.042	.073	.194(*)	1	-.063
	Sig. (2-tailed)	.307	.012	.626	.401	.024		.471
*Rating**	Pearson Correlation	.505(**)	.030	.669(**)	-.861(**)	-.138	-.063	1
	Sig. (2-tailed)	.000	.727	.000	.000	.112	.471	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix 3: Financial and Property Ratios

No.	*Category*	*Description*	*Operating and Financial Ratio*	*Property Ratio*	*Variable*
1	Size	Tangible fixed assets	Total assets	Property value	V
2	Coverage	Total size of debt	Total debt	Debt	D
3	Leverage	Long term capital intensiveness	Total debt/Total assets	Loan-to-value	D/V
4	Profitability	Short term capital intensiveness	Short term debt/Total assets	Break even	(OE+PMT)/GI
5	Liquidity	Total liquidity of the firm	Current assets/Current liabilities	Debt service coverage	PMT/NOI
6	Coverage	Measure of company's ability to pay bond holders	Pre-tax interest expense/Income	Interest coverage	(NOI-PMT)/NOI
7	Indenture provision	Subordination status	(0-1)		
8	Efficiency	Quality of management	Net operating income/Sales	Operating expenses ratio	NOI/GI

Source: Author's compilation from Belkaoui (1980); Rowland (1993) and Fischer(2004)

Appendix 4: CMBS Summary Details (1999-2005)

Sector	Issue	Issued Amount (A$m)	Note Tenure (Years)	Property Details							Financial Details			Tenant/Lease Details				No. of Assets		
				Total	Capital Value			Net Income ($m)			Gearing		LF	CQI	TC	WALE	OR	TA	Diversity	
				Lettable Area (m²)	Market Value (AU$m)	S&P Stressed Value (AU$m)	Capital Value Discount (%)	Market Net Income (AU$m)	S&P Net Income (AU$m)	Net Income Discount (%)	DSCR	LTV							PD	GD
All																				
	Min	0	1	49,650	200	200	0	18	17.90	0	1.20	32.0%	1.16%	0%	20%	3.6	83.0%	1	8.0%	0.20
	Max	350	7	1,008,603	1,880	1,660	22.9%	142.20	120.30	22.5%	3.50	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	100.0%	1.00
	Average	75	4	349,805	760	672	11.0%	62.00	56.28	9.0%	2.14	45.1%	3.1%	37.5%	45.8%	7.8	97.2%	21	29.8%	0.47
Diversified																				
	Min	1	3	97,316	265	228	7.3%	21.00	19.50	3.0%	1.29	32.0%	1.9%	17.9%	42.0%	3.6	91.3%	7	9.7%	0.32
	Max	350	6	588,200	1,430	1,255	20.2%	123.87	107.80	13.4%	3.50	68.0%	4.4%	56.0%	67.0%	10.0	99.0%	25	60.2%	0.51
	Average	62	4	284,666	688	606	12.0%	56.79	50.97	9.3%	2.10	46.1%	3.2%	39.5%	50.9%	7.1	97.0%	19	35.5%	0.40
Industrial																				
	Min	5	1	500,844	454	399	3.0%	46.00	37.80	2.0%	1.46	33.0%	2.0%	24.2%	24.3%	4.1	94.0%	26	8.0%	0.48
	Max	185	5	1,008,603	1,147	885	22.9%	92.26	84.10	17.8%	3.10	68.0%	3.3%	24.2%	25.0%	6.3	99.0%	39	14.0%	0.79
	Average	60	3	787,841	808	701	12.2%	74.79	67.53	9.8%	2.40	42.6%	2.5%	24.2%	24.9%	5.4	97.6%	34	10.2%	0.63
Office																				
	Min	10	1	49,650	495	473	4.4%	34.40	29.30	5.4%	1.28	32.0%	1.2%	13.3%	39.0%	4.1	83.0%	1	11.9%	0.26
	Max	350	5	431,691	1,880	1,660	16.4%	142.20	120.30	22.5%	2.40	62.0%	3.4%	75.0%	79.9%	8.0	99.5%	21	100.0%	1.00
	Average	133	3	310,142	1,220	1,084	10.9%	96.40	83.27	13.6%	2.04	41.0%	2.2%	44.3%	54.2%	5.7	96.4%	13	26.3%	0.49
Retail																				
	Min	0	3	91,152	200	200	0.0%	17.90	17.90	0.0%	1.20	35.0%	2.0%	0.0%	20.1%	4.0	93.0%	2	11.0%	0.20
	Max	240	7	533,343	1,380	1,100	20.3%	92.80	85.40	13.9%	3.30	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	64.0%	0.78
	Average	61	5	189,845	524	468	0.10	41.76	39.06	5.9%	2.09	0.48	0.04	0.30	0.45	13.9	0.98	20	0.37	0.45

LF: Liquidity Facility (% of stressed value)
WALE: Weighted Average Lease Expiry (Years)
TC: Tenancy Concentration (Top 5 tenants as % of total gross income)
PD: Property Diversity (% of portfolio value)
CQI: Credit Quality of Income (% of income from investment grade tenants)
OR: Occupancy Rate (%)
GD: Geographic Diversity Herfindahl Index
TA: Total number of properties

Source: Author's compilation from various Standard and Poor's CMBS presale reports

Appendix 5: Variable Scatter Plots

Figure 1 CMBS Rating vs. LTV (Strong relationship)

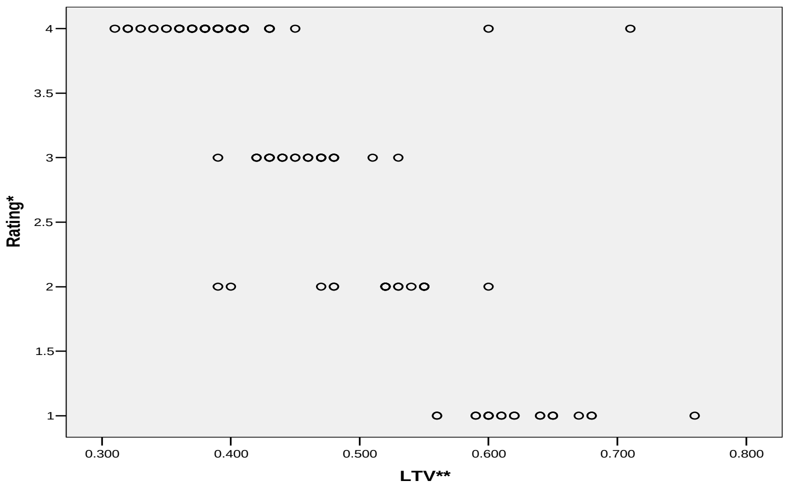


Figure 2 CMBS Rating vs. DSCR (Weak relationship)

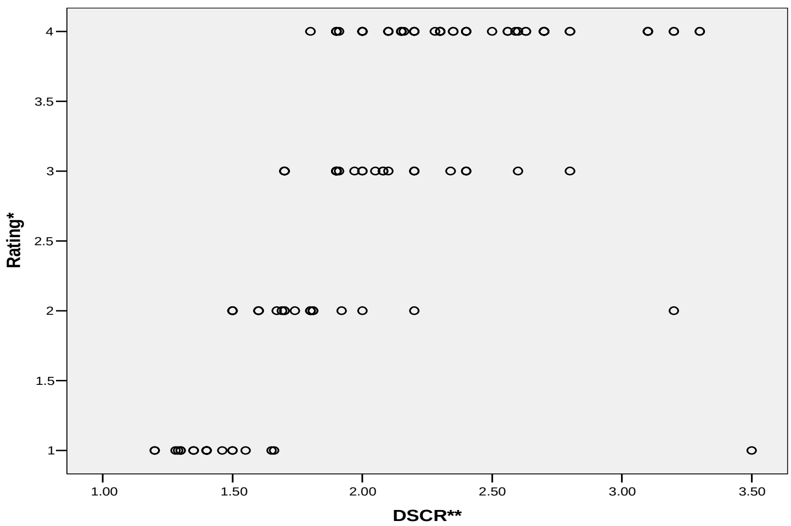


Figure 3 CMBS Rating vs. Issued Amount (No relationship)

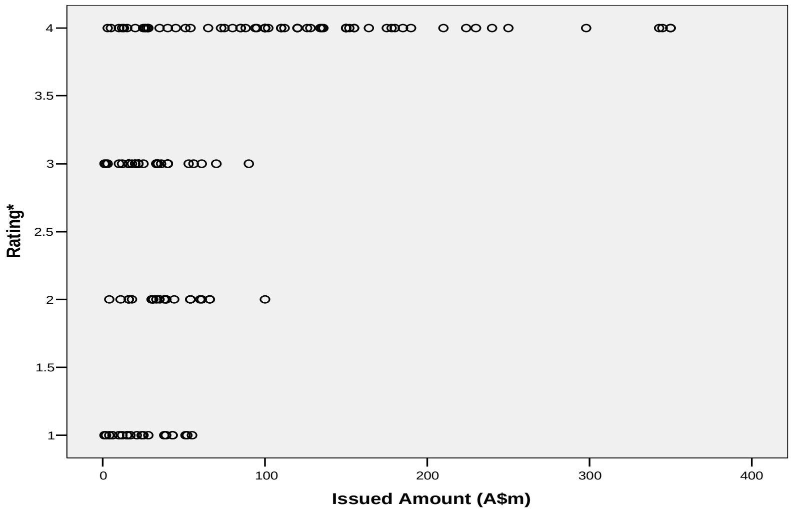


Figure 4 CMBS Rating vs. Bond Tenure (No relationship)

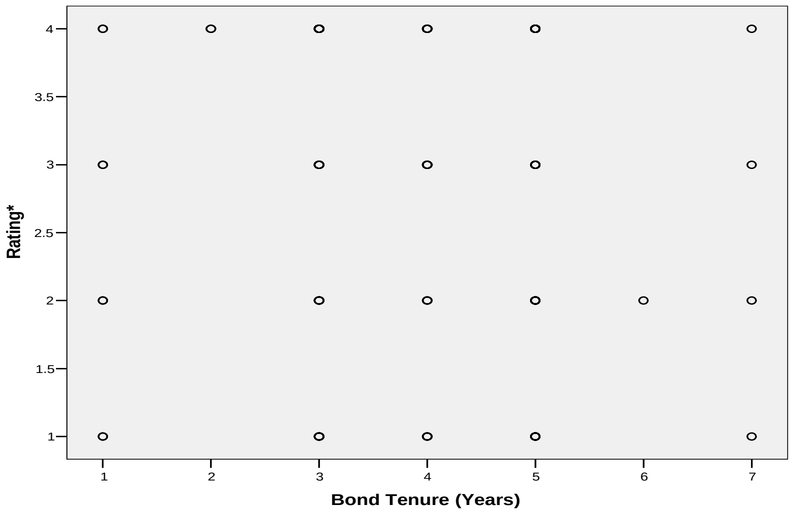


Figure 5 CMBS Rating vs. Property Diversity (No relationship)

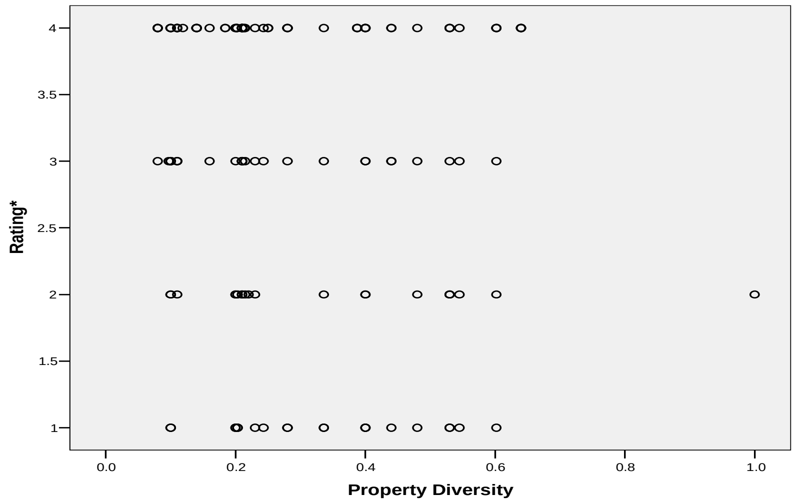
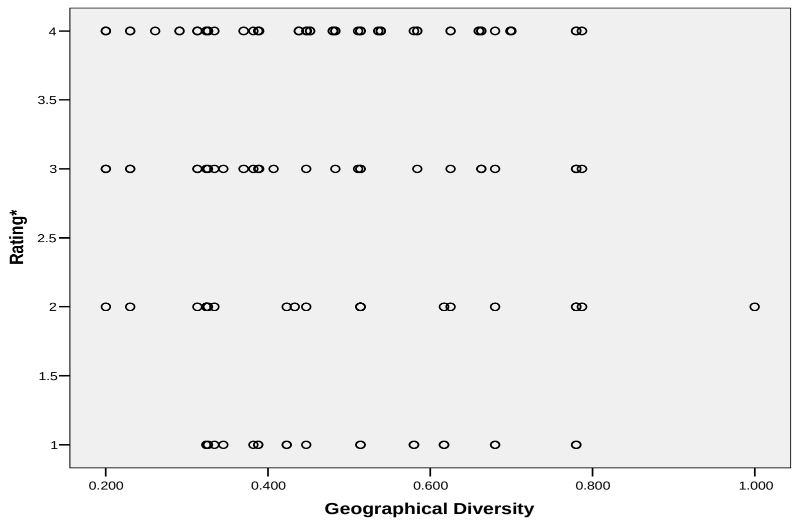


Figure 6 CMBS Rating vs. Geographical Diversity (No relationship)



Appendix 6: ANN Error Distribution

Model 1

Class	*# Cases*	*# Errors*	*% Errors*
AAA	59	4	6.78%
AA	23	1	4.35%
A	17	6	35.29%
BBB	19	0	0.00%
Total	118	11	9.32%

Model 2

Class	# Cases	# Errors	% Errors
AAA	59	0	0.00%
AA	23	2	8.70%
A	17	6	35.29%
BBB	19	1	5.26%
Total	118	9	7.63%

Model 3

Class	*# Cases*	*# Errors*	*% Errors*
AAA	59	2	3.39%
AA	23	3	13.04%
A	17	5	29.41%
BBB	19	1	5.26%
Total	118	11	9.32%

Assessing Property Risk in Australian Commercial Mortgage-Backed Securities

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ABSTRACT

The paper investigates how property risk in Australian Commercial Mortgage-Backed Securities (CMBS) issued between 2000 and 2005 can be assessed and reported in a more systematic and consistent approach to be easily understood by institutional investors. Adequate assessment of property risk and its reporting is critical to the success of CMBS issues. We adopt a framework of assessing property risk in CMBSs based on Adair and Hutchinson's (2005) delineation of property risk. Our framework shows that assessing and reporting property risk in Australian CMBSs, which are primarily backed by direct property assets, under the headings of investment quality risk, covenant strength risk, and depreciation and obsolescence risk can easily be done. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

Keywords:

Commercial Mortgage-Backed Securities; Property Risk; Loan-to-Value Ratio; Debt Service Coverage Ratio; Diversification

1.0 INTRODUCTION

Asset-backed securitisation (ABS) is a creative arrangement for raising funds through the issuance of marketable securities backed by predictable future cash flows from revenue producing assets (2004a). In Australia, Commercial Mortgage-Backed

Securities (CMBS), a sub-class of ABS, are predominantly in the form of securitisation of direct property assets (Jones Lang LaSalle 2001). According to Henderson and ING Barings (1997) assets backing a securitisation are its fundamental credit strength. In the case of Australian CMBSs this involves looking at property backing these issues vis-à-vis property risk. There are four main areas of risk in securitisation, namely asset risk; cash flow risk; legal risk; and third party risk. Moody's Investor Service (2003) state that the credit risk of a mortgage loan will depend on the characteristics of the underlying properties; the loan structure; loan-to-value (LTV) and debt service coverage ratio (DSCR); the overall portfolio diversification; and other factors, such as the transaction structure, legal risk and servicing quality. They further state that the assigned rating is the relative risk of the collateral and its ability to generate income. Therefore, the ratings inform the public of the likelihood of an investor receiving the promised principal and interest payments associated with the bond issue (Shin & Han 2001).

In this paper, property risk is delineated as in line with Adair and Hutchinson's (2005) property risk scoring model. The key headings under this model are:

- Market transparency risk;
- Investment quality risk;
- Covenant strength risk; and
- Depreciation and obsolescence risk.

However, of concern are the last three property risk parameters since market transparency risk is not an issue for the Australian property market. Australia is one of the most transparent property markets, ranked first together with the USA (Jones Lang LaSalle 2006b) and has the most highly securitised commercial property market in the world (Hughes & Arissen 2005). Table 1 shows the placement of Australia on Jones Lang LaSalle (JLL) Global Transparency Index as at December 2006. JLL define transparency as "as any open and clearly organized real estate market operating in a legal and regulatory framework that is characterized by a consistent approach to the enforcement of rules and regulations and that respects private property rights". They further add that "the ethical and professional standards of private sector advisors, agents and brokers who are licensed to conduct business in each country have to be high".

Table 1: JLL Global Real Estate Transparency Index: 2006

Highly transparent:

Australia, US, New Zealand, Canada, UK, Hong Kong, Netherlands, Sweden, France, Singapore

Transparent:
Finland, Germany, South Africa, Denmark, Austria, Ireland, Belgium, Spain, Switzerland, Norway, Italy, Malaysia, Japan, Portugal

Semi-transparent:
Mexico, Czech Republic, Hungary, Poland, Israel, Taiwan, South Korea, Slovakia, Chile, Greece, Russia, Philippines, Brazil, Slovenia, Thailand, Argentina, India

Low transparency:
China, Macau, UAE, Costa Rica, Indonesia, Turkey, Peru, Romania, Colombia, Uruguay, Saudi Arabia, Panama

Opaque:
Egypt, Venezuela, Vietnam

Source: Jones Lang LaSalle (2006)

According to Hughes and Arissen (2005), 30.2% of Australia's investment-grade property was listed on the stock market and the share of listed property as a percentage of overall stock market was 10.7%, higher than any other country in the world (see Table 2).

Table 2: Global Levels of Securitised Property

Country	*Percentage of property listed on stockmarket*	*Percentage of stockmarket*
Australia	30.2%	10.7%
Hong Kong/China	26.0%	5.5%
Singapore	26.05	9.3%
Luxembourg	12.5%	5.9%
Sweden	9.9%	3.5%
Canada	7.5%	2.6%
US	7.2%	2.3%
Netherlands	6.5%	3.4%
New Zealand	5.6%	5.2%
Austria	5.1%	4.6%
UK	4.6%	1.7%
Japan	4.2%	2.2%
France	3.5%	1.6%
Switzerland	3.1%	0.6%
Spain	2.9%	1.7%
Total	**5.6%**	**2.3%**

Source: Hughes and Arissen (2005)

The advantage of having a highly securitised property market is that investors have more publicly available information on property risk as a result of the listed property companies being legally bound to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity investors.

To date few studies have been done on Australia CMBSs outside the credit rating agency circles. These studies are predominantly practitioner focused (Jones Lang LaSalle 2001; Richardson 2003; Roche 2000, 2002). Chikolwa (2007a), O'Sullivan (1998) and Simonovski (2003) are the only academic studies on CMBSs. Roche (2002) presents a model used by ABN AMRO to rank Australian CMBSs, whereas other studies all look at CMBS market structures and development. However, none of these studies have looked at property risk assessment within CMBSs.

As such, the purpose of this paper is to investigate how property risk as assessed in Australian CMBSs over 2000-2005 can be clearly reported in a more concise and systematic approach; particularly focussing on assessment of investment quality risk, covenant strength risk, and depreciation and obsolescence risk. Other secondary risk factors such as legal risk relating to issues such insolvency and bankruptcy and third party risk involving the credit rating of support parties such as security trustees, interest rate providers and liquidity facility providers, are not discussed in this paper. Common structural mechanisms have been set up to mitigate secondary risk in all CMBS issues. We refer readers to Standard and Poor's, (2005c), Clayton UTZ (2003) and Moody's Investor Service (2003). The framework should prove useful to rating agencies, bond issuers and institutional investors. Rating agencies can adopt a more systematic and consistent approach towards reporting of assessed property risk in CMBS. Issuers and institutional investors can examine the perceived consistency and appropriateness of the rating assigned to a CMBS issue by providing inferences concerning property risk assessment.

The remainder of the paper is organised as follows. In section 2, we present the significance of risk assessment in property investments. Section 3 contains methodology and data. Results and discussion are presented in section 4. Section 5 presents a case study showing how property risk was assessed and adopted mitigating strategies. Finally, we conclude in section 6.

2.0 SIGNIFICANCE OF PROPERTY RISK ASSESSMENT

There has been significant growth in the area of property risk research in both the valuation and investment realm from the year 2000. The debate for more property risk research started with the Mallinson Report (RICS 1994). One of the recommendations of this report was that common professional standards and methods should be developed for measuring and expressing valuation uncertainty. Mallinson and French (2000) took this recommendation a step further by examining in-depth the reporting of uncertainty within valuation to the client. They proposed a statistical method to account for uncertainty in valuation reports. The Investment Property Forum/Investment Property Databank (2000; 2002) also highlighted the need for more rigorous risk assessment measures within the property profession. More specifically they concluded that a new approach was needed which combined conventional analysis of returns uncertainty with a more comprehensive survey of business risks. This debate was brought into sharper focus by the publication of the Carsberg Report (RICS 2002) , which emphasised the need for more acceptable methods of expressing uncertainty, particularly when pricing in thin markets where information is deficient.

Furthermore the debate on the reporting of risk was taken forward by The European Group of Valuers Association (TEGoVA) (2003) by the publication of the "European Property and Market Rating: A Valuer's Guide". The function of the rating system is to support risk, property, and loan analyses of portfolios in connection with securitisation, investment and disinvestment decisions and granting of property loans respectively. An earlier publication by TEGoVA (2002) entitled "European Mortgage Securitisation: A Valuer's Guide" provided valuers with criteria for determination of the risk profile in the European mortgage-backed securities market. The International Valuation Standards Committee (IVSC) (2006c) has also published a white paper on guidelines for the valuation of property-backed securitised assets, with a call for comments on these guidelines. The thrust of the white paper is that these assets should be assessed on a discounted cash flow basis accounting for all risk factors.

Lorenz et al (2006) show how rating and simulation approaches can be used in property valuation to address uncertainty and risk. Hutchinson et al (2005) develop a generic market model that can be used to risk score individual property investments utilising the Analytic Hierarchy Process (AHP), a multi-criteria decision making tool. Adair and Hutchinson (2005) examine risk analysis within investment decision-making framework and the property industry and further explain how their property risk scoring framework can be applied. French and Gabrielli (2004; 2005) show the superiority of using simulations in property valuation to account for uncertainty. Despite attempts by these studies for better assessment of risk and uncertainty and their communication to clients, Lorenz (2006) and Joslin (2005) concede that the concept of uncertainty within property valuation is poorly understood and that it is rarely conveyed to clients in a coherent form.

Further impetus for the explicit communication of risk in property has emerged more recently under the requirements of the Basel 2. The implications of Basel 2 are that banks must be more explicit about the risks of lending. As property constitutes a major source of such lending the identification, analysis and communication of the risks involved are becoming more important (The Economist 2005).

Lorenz et at (2006) also report that confusion surrounds the terms risk and uncertainty within valuation literature because they are often used interchangeably and because one can often be found within the description of the other. They do not offer a definition of risk but follow Chicken and Posner's (1999) classification of the constituents of risk as shown below:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Whereby hazard is the way in which a thing or situation can cause harm while exposure is the extent to which the likely receipt of the harm can be influenced by the hazard. This is analogous to the perception of risk in CMBS in terms of the probability of default and severity of loss. The probability of default is measured through debt service coverage ratio (DSCR) and severity of loss through loan-to-value (LTV) ratio. Fabozzi and Jocob (1997) state that these are the main criterion used to quickly assess the risk of CMBS deals. The LTV is calculated by dividing the total amount of the notes issued by the current market value of all the properties. The DSCR is calculated by dividing the total net passing income of the properties by the debt-servicing amount. The debt-servicing amount is derived by multiplying credit rating agencies' stressed interest rate assumption by the notes' issuance amount.

Credit rating agencies establish a stabilised net cash flow and an 'assessed capital value', which are used as the basis of the debt-sizing calculations. The appropriate LTV and DSCR are applied to those values. The capitalisation rate used to determine the 'assessed capital value' is a function of the risk and return of the asset, reflecting its age, quality, location, and competitive position within the market.

Moody's Investor Service (2003) state that the core of their analysis is the assessment of cash flows that will be available to service the debt during the term of the loans and for refinancing, if necessary. Sustainable cash flows are meant to represent the cash-generating potential of a property looking through the real estate cycle. Underwriting at or near the peak is more likely to produce unsustainable incomes and capital values than underwriting at the bottom of the cycle. For instance, Fitch Ratings (1999) show that a rating of 'A' or higher should be have survived the early 1990's Australian recession intact. Transactions rated lower than 'A' would suffer losses. At the peak of the recession in 1992, interest rates rose to 17% and commercial real estate market in Sydney, Melbourne, Perth and Adelaide were severely hit. In general, net effective rents on commercial properties decreased more than 50%, vacancy rates increased to more than 20%, and values dropped more than 50%.

The study's major contribution is offering a framework for assessing and communicating property risk for the success of the CMBS issues. As pointed out earlier, risk and uncertainty are poorly understood in property valuation and this may extend to CMBSs since property assets are the fundamental credit strength of Australian CMBSs. CMBS investors are able to make informed decisions before investing in CMBSs on the premise that issuers and credit rating agencies have systematically and consistently assessed property risk before launching the issues and assigning credit ratings respectively.

1.0 METHODOLOGY AND DATA

All the CMBSs issued over a six year period of 2000 to 2005 were obtained from Standard and Poor's presale reports as found in their Ratings Direct database to identify and review how property risk factors were addressed in all issues and within specific property asset classes following the delineation of property risk by Adair and Hutchinson (2005). We compare and contrast property risk assessment by using various parameter averages within CMBS issues, across property sectors and other industry set standards over the assessment period.

Our dataset comprised a total of 49 generic CMBSs (excluding credit lease and small ticket transactions) with a total of 135 tranches, worth over AU$10.3 billion. Generic CMBSs[27] account for 62% of all CMBS issuances (Standard & Poor's 2005a). Credit lease and small ticket transactions are not discussed in this paper. Table 3 presents a summary of aggregated details of all the Australian CMBSs issued from 2000 to 2005; these account for nearly 69% of all CMBSs by worth.

[27] These are mainly single-borrower transactions.

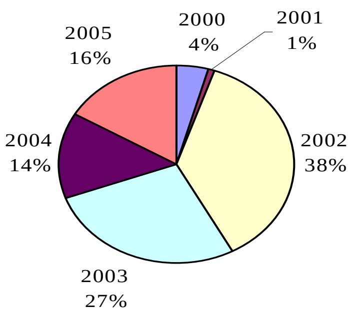
Table 3: Summary of Australian CMBS (2000-2005)

Sector	Issue	Issued Amount (A$m)	Note Tenure (Years)	Property Details							Financial Details			Tenant/Lease Details				No. of Assets		
				TLA (m²)	Capital Value			Net Income ($m)			Gearing		LF	CQI	TC	WALE	OR	TA	Diversity	
					MV (AU$m)	S&P SV (AU$m)	CDV (%)	NMI (AU$m)	S&P NI (AU$m)	NID (%)	DSCR	LTV							PD	GD
All	Min	0	1	49,650	200	200	0	18	17.90	0	1.20	32.0%	1.16%	0%	20%	3.6	83.0%	1	8.0%	0.20
	Max	350	7	1,008,603	1,880	1,660	22.9%	142.20	120.30	22.5%	3.50	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	100.0%	1.00
	Average	75	4	349,805	760	672	11.0%	62.00	56.28	9.0%	2.14	45.1%	3.1%	37.5%	45.8%	7.8	97.2%	21	29.8%	0.47
Diversified	Min	1	3	97,316	265	228	7.3%	21.00	19.50	3.0%	1.29	32.0%	1.9%	17.9%	42.0%	3.6	91.3%	7	9.7%	0.32
	Max	350	6	588,200	1,430	1,255	20.2%	123.87	107.80	13.4%	3.50	68.0%	4.4%	56.0%	67.0%	10.0	99.0%	25	60.2%	0.51
	Average	62	4	284,666	688	606	12.0%	56.79	50.97	9.3%	2.10	46.1%	3.2%	39.5%	50.9%	7.1	97.0%	19	35.5%	0.40
Industrial	Min	5	1	500,844	454	399	3.0%	46.00	37.80	2.0%	1.46	33.0%	2.0%	24.2%	24.3%	4.1	94.0%	26	8.0%	0.48
	Max	185	5	1,008,603	1,147	885	22.9%	92.26	84.10	17.8%	3.10	68.0%	3.3%	24.2%	25.0%	6.3	99.0%	39	14.0%	0.79
	Average	60	3	787,841	808	701	12.2%	74.79	67.53	9.8%	2.40	42.6%	2.5%	24.2%	24.9%	5.4	97.6%	34	10.2%	0.63
Office	Min	10	1	49,650	495	473	4.4%	34.40	29.30	5.4%	1.28	32.0%	1.2%	13.3%	39.0%	4.1	83.0%	1	11.9%	0.26
	Max	350	5	431,691	1,880	1,660	16.4%	142.20	120.30	22.5%	2.40	62.0%	3.4%	75.0%	79.9%	8.0	99.5%	21	100.0%	1.00
	Average	133	3	310,142	1,220	1,084	10.9%	96.40	83.27	13.6%	2.04	41.0%	2.2%	44.3%	54.2%	5.7	96.4%	13	26.3%	0.49
Retail	Min	0	3	91,152	200	200	0.0%	17.90	17.90	0.0%	1.20	35.0%	2.0%	0.0%	20.1%	4.0	93.0%	2	11.0%	0.20
	Max	240	7	533,343	1,380	1,100	20.3%	92.80	85.40	13.9%	3.30	76.0%	13.3%	100.0%	100.0%	30.0	100.0%	101	64.0%	0.78
	Average	61	5	189,845	524	468	0.10	41.76	39.06	5.9%	2.09	0.48	0.04	0.30	0.45	13.9	0.98	20	0.37	0.45

Key:
LF: Liquidity Facility (% of stressed value)
CQI: Credit Quality of Income (% of income from investment grade tenants)
MV: Market Value
S&P CV: Standard & Poor's Stressed Value
WALE: Weighted Average Lease Expiry (Years)
OR: Occupancy Rate (%)
CDV: Capital Value Discount
TLA: Total Lettable Area
TC: Tenancy Concentration (Top 5 tenants as % of total gross income)
GD: Geographic Diversity Herfindahl Index
S&P NI: Standard & Poor's Net Income
NID: Net Income Discount
PD: Property Diversity (% of portfolio value)
TA: Total number of properties
DSCR: Debt Service Coverage Ratio
LTV: Loan-to-Value Ratio

Over the study period, the peak issuance year was the year 2002 with 19 (38%) followed by the year 2003 at 14 (27%) issues. The years 2004 and 2005 had comparatively similar issuances at 7 (14%) and 8 (16%) respectively. The formative years of 2000 and 2001 had issues of 2 (1%) and 5 (4%) respectively. These figures are represented in Figure 3.

Figure 1: Australian CMBS Issuance by Percentage (2000-2005)

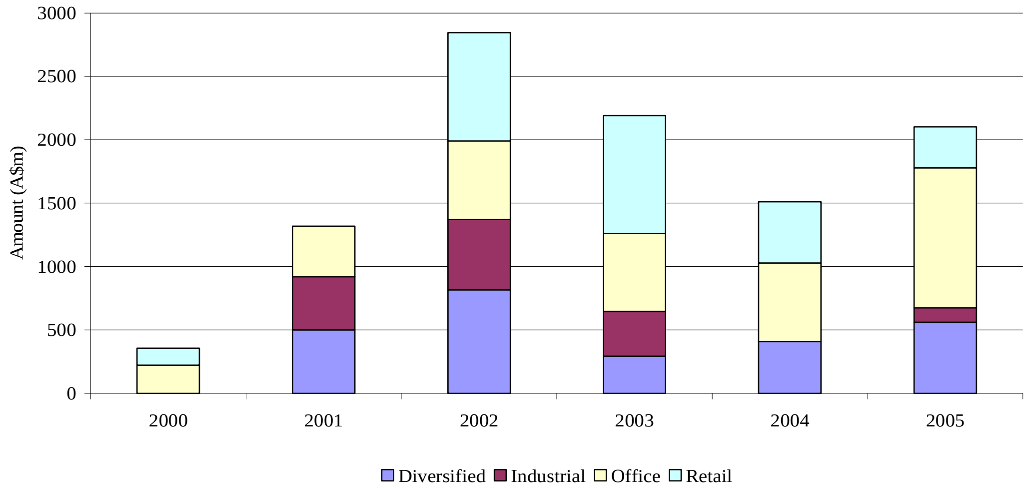


Source: Author's compilation from various Standard and Poor's CMBS presale reports

Figure 2 presents the CMBS issuance by sector over 2000 to 2005. Over this six year period, the most dominant CMBS issues have been in the office sector (AU$3.6 billion), followed by the retail sector (AU$2.7 billion). The diversified sector[28] and the industrial sector have had AU$2.6 billion and AU$1.4 billion worth of CMBS issuance respectively.

[28] These are property portfolios composed of different property types.

Figure 2: Australian CMBS Issuance by Sector Amounts (2000-2005)



Source: Source: Author's compilation from various Standard and Poor's CMBS presale reports

Specific details obtained per CMBS issue were:

- Total lettable area, capital values, and net income;
- Gearing and transaction structure details;
- Tenancy and lease details relating to the credit quality of tenants, tenant concentration, and lease expiry profiles;
- Asset quality details relating to location, average age, condition, and tenancy retention;
- Diversification and total number of assets backing the issues; and
- Management profile of issuers.

To further illustrate property risk assessment in CMBS issues, *Multiplex CMBS Issuer Ltd. Series 2005-1 & 2005-2* are taken as case-study, with all publicly available data collected from credit rating agencies CMBS presale reports and the company's website. The Multiplex CMBS issues were selected on account of being the largest and most recent during our study period.

4.0 RESULTS AND DISCUSSION

The CMBS data collected as pointed out in Section 3 were analysed on an aggregated basis to compare property risk assessment within the various property sub-classes using our framework. The results of the analysis under the delineation of property risk are shown below.

4.1 Investment Quality Risk

Cross and Over Collateralisation

Cross-collateralisation is a standard feature in Australian CMBS issues. Equity and cash flows from performing properties are available to support weaker properties, improving the probability of default and the recovery assumptions on the loan. Large asset backing contributes to the attainment of a higher credit rating (Moody's Investor Service 2003). Lee (2007), among other authors, asserts that real estate portfolios with smaller number of properties have a higher volatility of portfolio returns than larger portfolios. Averages of 18 properties (285,000m^2) backed diversified issues, whereas 34 properties (788,000m^2) backed industrial issues. Office property-backed issues had an average of 13 properties (310,000m^2) with 20 properties (190,000m^2) for retail property-backed issues.

Overcollateralisation is achieved by the special purpose vehicle owning assets to a greater value than the funds it raises from investors or lenders (Henderson & ING Barings 1997). In case of default, the market value should be able to meet all loan repayments. However, credit rating agencies substantially discount market values and net income to arrive at their “stressed values” on a worst-case basis as pointed out in Section 2. Stressed values are the basis on which loan-to-value ratio (LTV) and debt-to-service coverage ratio (DSCR) are determined. These are the main criterion used to quickly assess credit risk of CMBS deals (Fabozzi & Jacob 1997). DSCR is the main driver of frequency of default, while LTV is the key factor for expected severity of loss. LTV is calculated by dividing the total amount of the notes issued by the current market value of all the properties, while DSCR is calculated by dividing the total net passing income of the properties by the debt-servicing amount. The debt-servicing amount is derived by multiplying credit rating agencies’ stressed interest rate assumption by the notes' issuance amount. This offers 'double-edged' protection to investors as the LTV and DSCR are based on discounted values.

On the basis of risk assessment of capital values and incomes between property asset classes, discounts applied as shown in Table 3 are investigated. Industrial property-backed issues showed the highest average capital value discount (12.2%) followed by diversified property-backed issues (12%), office backed issues (10.9%) and retail property-backed issues (10.0%). A further look at the average net rent discount shows office backed issues had the highest discount (13.6%) followed by industrial property-backed issues (9.8%), diversified property-backed issues (9.3%); and retail property-backed issues (5.9%) had the lowest discount. These discounts can be used as proxies of portfolio composition and CMBSs that can be issued. For instance, a CMBS issue of AU$100 million needs to be backed by a portfolio value of AU$109 million at a market average discount of 10.9% in the case of office backed issues.

These results show that the composition of a property portfolio backing an issue and the capital and rental discounts applied, considered the volatility of the of the various property sub-classes. Moody's (2003) assert that volatility of property classes in Australia runs from the least being retail property, followed by industrial property, office property and lastly hotel property.

Occupancy Rates

Occupancy rates in all issues ranged between 83% and 100% way over industry averages. Retail property-backed issues had an average occupancy rate of 98% in line with the average national occupancy rates of 97%-98% followed by diversified and industrial property-backed issues which had 97% each. Office property-backed issues had an average occupancy rate of 96%, significantly above the average national occupancy rate of 92.5% as at December 2005 (Colonial First Estate Global Asset Management 2006). High occupancy rates mitigate the risk of rental loss due to vacancies.

Loan-to-Value (LTV) Ratio and Debt Service Coverage Ratio (DSCR)

As pointed out in Section 2, the risk and return profile of an asset reflects its age, quality, location, and competitive position within the market. These aspects are captured in the capitalisation rate adopted for property valuation. The 'assessed capital value' is the basis of the debt-sizing calculations of LTV and DSCR.

The incidence of default rises with the LTV; that is, if all other factors are held constant, the probability of default for a loan increases as the LTV increases, but not equally. Unlike the LTV, where the probability of default increases as the LTV rises, the incidence of default is a decreasing function of the DSCR. However, the relationship between the DSCR and the probability of default is weaker than the relationship between the LTV and default. Table 4 shows composite ranges for both DSCR and LTV across all rating classes assigned during the study period. It should be noted that various rating classes have specific LTV and DSCR ranges. As we progress from the lower notes (BBB) to higher notes (AAA), LTV thresholds decrease and DSCR thresholds increase respectively. Details of indicative LTV and DSCR threshold levels in various asset classes can be found in Standard and Poor's (2003c) and Jones Lang LaSalle (2001).

Table 4: LTV and DSCR Threshold in Australian CMBS Issues (2000-2005)

Sector	***DSCR (times)***		***LTV range (%)****	
	Min	***Max***	***Min***	***Max***
Diversified	1.29	3.50	0.32	0.68
Industrial	1.46	3.10	0.33	0.68
Office	1.28	2.40	0.32	0.62
Retail	1.20	3.30	0.35	0.76

Source: Author's compilation from Standard and Poor's CMBS presale reports

DSCR ranged from 1.28 to 3.1 for the industrial and office property-backed issues whereas retail property-backed issues had a slightly higher range of 1.2 to 3.3. As for LTV ratios, the highest range was again in the retail property-backed issues from 0.35 to 0.76 with those backed by the diversified, industrial and office property-backed issues ranging from 0.32 to 0.62 as shown in Table 2. This confirms the earlier Moody's Investor Service (2003) and Jones Lang LaSalle (2001) suppositions of retail properties having the least cash flow and asset value volatility and hence rating agencies assessing them at higher LTV and DSCR ranges.

Liquidity Facility

This covers interest shortfalls and amounts necessary to preserve and protect the mortgage collateral. The standard has been to allow for six months' of note payments at the credit rating agency's refinance constant for six months' of transaction expenses. Across all issues this ranged from 1.16% to 13.3% of S&P's accessed capital values. Diversified property-backed issues had a range of 1.9%-4.38%; industrial property-backed issues ranged from 1.96%-3.34%; and office property-backed issues from 1.16%-3.4%. The largest range was in the retail property-backed issues which had 2.0%-13.3%.

A probable explanation for the high liquidity facility ranges in retail properties could be the higher need to continually maintain and update these assets in comparison to office and industrial properties. Further, retail properties and office properties have a larger number of tenants than in industrial properties which entails having larger allowances to mitigate rent payment delays.

Overall Portfolio Diversity

The diversity of a portfolio of assets will have an impact on the volatility of the pool's expected loss. Diversity is examined by property type, geographic location, loan/property concentration and economic sector. By diversifying the mix of property types, one can mitigate a pool's expected loss. Geographic diversity mitigates the risk of single market decline and may reduce any losses associated with this type of risk. Generally, loans secured by operational real estate such as hotel properties tend to have the highest default probability followed by unanchored retail properties and office properties. Loans secured by anchored retail and industrial/warehouse properties have the lowest default levels (Jones Lang LaSalle 2001). Roche (2002) further expands this assertion by stating that diversity across property type is more valuable than geographic diversity because the market for investment grade in Australia is relatively small and values across cities for specific asset types, such as single tenanted, large office properties in secondary CBD or suburban locations, are highly correlated. Table 5 shows the current composition of securitised portfolios.

Table 5: Current Composition of Property Portfolios

Property Type	***Property Portfolios***			
	Diversified	***Industrial***	***Office***	***Retail***
Hotel	√			
Cinema	√			√
Car park	√			
Warehouse/Distribution	√	√		
Business/Office park	√	√		
Industrial estate	√	√		
Container park	√			
Campus	√			
Development site/Hi-tech	√	√		
CBD A-grade offices	√		√	
Non-CBD A-grade offices	√		√	
Regional shopping centre				√
Sub-regional shopping centre				√
Neighbourhood shopping centre				√
Bulky goods retail centre				√

Following Hedander (2005) who used a diversity scoring system based on the Herfindahl Index to measure diversity on a geographic and property type concentration basis in Australian listed property trusts, we adopt a similar procedure to measure diversity in Australian CMBS portfolios. This index effectively converts a pool of CMBS issues of uneven size into a measurement of diversity, as if all issues were the same size. A totally focussed CMBS issue has an index equal to one, while the index for a diversified CMBS issue is closer to zero.

The Herfindahl geographic region index (HHGR) for each respective CMBS issue is calculated as follows:

$$\text{HHGR} = \sum_{j=1}^{8}\left(\frac{x_j}{x}\right)^2$$

where j = Geographic region: the states in Australia (New South Wales,

Victoria, Queensland, South Australia, Western Australia, Northern Territory, Australian Capital Territory (ACT) and Tasmania,

x_j = percentage of asset type in portfolio

x = total portfolio composition

Of all the sector issues, diversified property-backed issues had the most geographical diversity with an average score of 0.40 followed by retail and office property-backed issues with scores of 0.45 and 0.49 respectively. Industrial property-backed issues had the least diversity with a score of 0.63. An explanation of this is that the eastern states of New South Wales and Victoria account for the bulk of Australia's gross domestic product. Retail and office properties included in most issues are found in most states with little representation in Tasmania and Northern Territory.

The Herfindahl property type index (HHPT) for each respective CMBS issue is calculated as follows:

$$\text{HHPT} = \sum_{i=1}^{6}\left(\frac{x_i}{x}\right)^2$$

where i = type of property: industrial, office, retail, hotel, car park, other

x_i = percentage of asset type in portfolio

x = total portfolio composition

Assessment for diversity by property type basis was only undertaken for the diversified property-backed sector, which had a score of 0.77. Lack of adequate data was the reason for not assessing the retail, office and industrial sectors.

Another measure of diversity is the percentage of the largest property by value in relation to the whole portfolio value. A large single property value exposure has a negative impact on the portfolio in instances of default. The retail property-backed sector had the largest average single property value concentration at 37.5% due to the large size of the properties both on floor area basis and by market value. The least was the industrial sector at 10.2%. The diversified property-backed sector closely followed the retail property-backed sector at 35.5% whereas the office property-backed sector had an average of 26.3%.

Details on HHGR, HHPT and property diversity are found in Table 3.

4.2 Covenant Strength Risk

Covenant strength risk is impacted through credit quality of income, the weighted average lease expiry profile (Yoon et al.), and tenancy concentration. A large percentage of income from investment grade tenants minimises the incidence of default whereas a lower diversity of tenants increases the incidence of default.

Tenancy concentration is measured through the contribution of 5 or 10 top tenants' contribution to total net income. The office sector had the highest percentage of the 5 top tenants' contribution to net income at an average of 54.2% and the least was the industrial sector at 24.9%. The diversified and retail sectors had averages of 50.9% and 45.0% respectively.

As for credit quality of income which is measured by percentage of income from investment grade tenants, the same trend exhibited in tenancy concentration continues with office sector at 44.3%, diversified sector at 39.5%; retail sector at 30.5%; and industrial sector at 24.2% respectively. An explanation of this is that most office buildings included in CMBSs are prized-trophy properties occupied by large well established and often highly credit-rated firms. As for retail properties, apart from credit-rated anchor tenants such as the Woolworths group, Coles Mayer, David Jones, to name a few, the bulk of the tenants are small unrated specialties.

A higher weighted average lease expiry profile also lowers the incidence of default as there is a higher probability of rental receipt (Moody's Investor Service 2003). Nearly all issues had WALE profiles above the tenure of the issued notes, with the exception being the retail sector which has very long leases by some anchor tenants in excess of 15 years. The diversified sector had average WALE profile of 7.0 years and the office and industrial sectors had 5.6 and 5.4 years respectively.

4.3 Depreciation and Obsolescence Risk

In all the issues depreciation and obsolescence risk is mitigated by the inclusion of maintenance and capital expenditure reserves. Sufficient and regular capital expenditure is necessary to ensure that collateral quality, occupancy and value are maximised. A capital expenditure reserve may be required to ensure sufficient funds are available to cover any major capital expenditure works during the life of the transaction. Capital expenditure requirements may also be addressed via a facility from an appropriately rated counterparty. There are no set rules as each transaction has different requirements depending upon the condition of the assets, the gearing levels, and the positioning of the asset in the market. Some of the parameters in place are lump sums over a certain period or percentages of the independent valuation of the "core" properties.

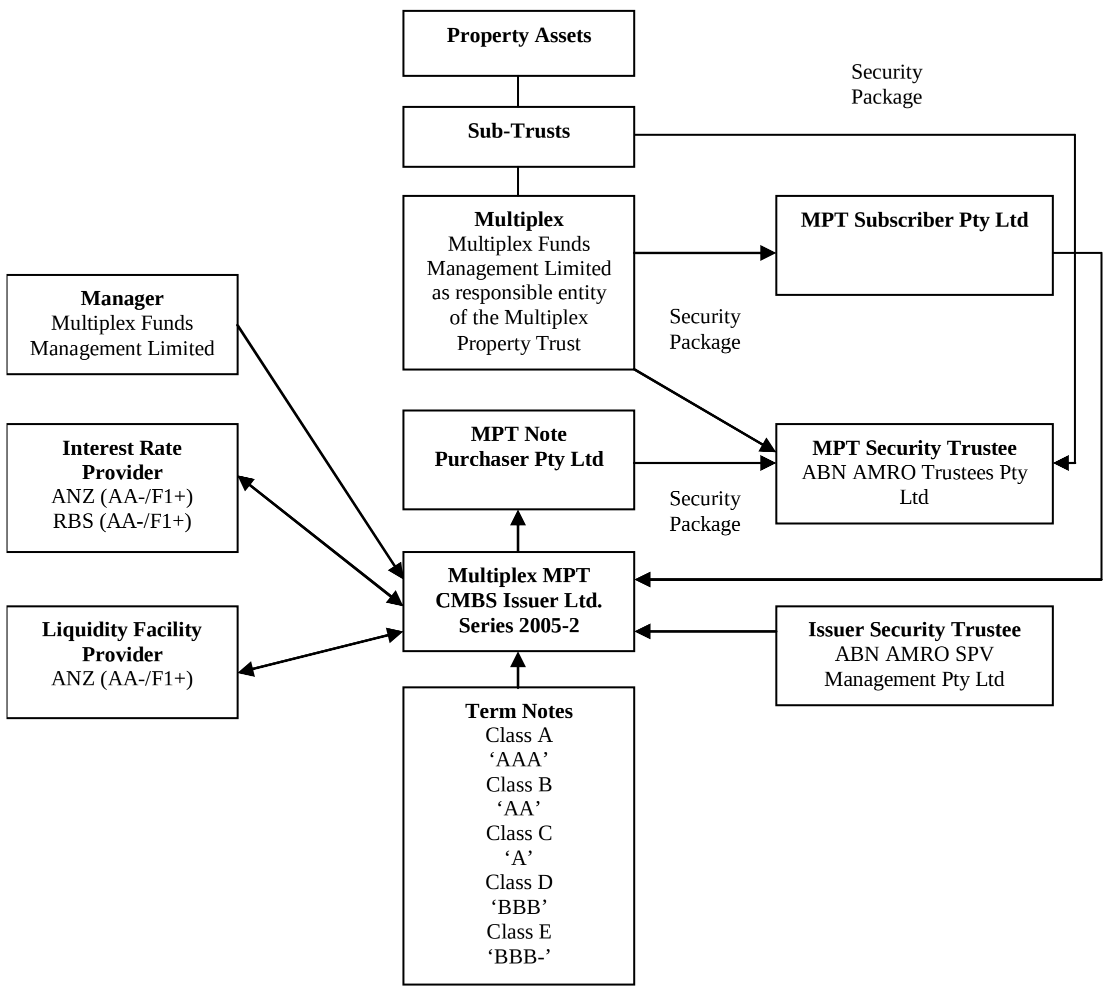
2.0 CASE STUDY: MULTIPLEX CMBS ISSUER LTD. SERIES 2005-1&2

Although the above analysis was conducted on an aggregated basis for comparison of property risk assessment across various property sub-classes, this analysis can be extended to compare property risk assessment between CMBS issues. In this section, the *Multiplex CMBS Issuer Ltd. Series 2005-1&2* CMBS issues are presented as a case study of how property risk can be assessed and reported using our framework.

5.1 Background

In May 2005 Multiplex Property Trust announced the launch of a AU$1 billion CMBS issue to settle a significant portion of its bank debt. A substantial reduction in their cost of debt was also announced at a weighted average margin of 0.334% per annum (Multiplex Property Trust 2005). The CMBS was in two series, with tranches ranging from AAA through to BBB-. Series One had a scheduled maturity of three years and Series Two five years. The CMBS was secured by 17 properties located in Sydney, Melbourne, Brisbane, Canberra and Perth, with a combined fair market value of AU$1.7 billion. The two series have a generic transaction structure. In Figure 3 we show the transaction structure of *Multiplex CMBS Issuer Ltd. Series 2005-2*.

Figure 3: Multiplex CMBS Issuer Ltd. Series 2005-2 Transaction Structure



Source: Fitch Ratings (2005a; 2005b) presale reports

5.2 Issue Details

Details of the CMBS issues as shown in Table 6 were analysed using the property sub-class averages in Table 1 and other industry benchmarks to assess property risk.

Table 6: Multiplex CMBS Issuer Ltd. Series 2005-1&2

	Multiplex CMBS Issuer Ltd. Series 2005-1				***Multiplex CMBS Issuer Ltd. Series 2005-2***			
Issue Date:	May 2005				May 2005			
Term-to-Maturity:	3 years				5 years			
Property Type:	8 Office Buildings				5 Retail (30.7%)* & 4 Office (69.3%)* Buildings			
Size:	245,323 m²				196,450 m²			
Aggregate Market Value:	AU$931.7m				AU$803.5m			
Issue Size:	AU$537m				AU$463m			
Tranche:								
AAA	AU$343m	(40.6%)	[2.03]	20bp	AU$298m	(40.5%)	[2.01]	25bp
AA	AU$61m	(47.8%)	[1.73]	30bp	AU$53m	(47.7%)	[1.70]	40bp
A	AU$54m	(54.2%)	[1.52]	40bp	AU$39m	(53.1%)	[1.53]	50bp
BBB	AU$51m	(60.2%)	[1.37]	57bp	AU$52m	(60.1%)	[1.35]	75bp
BBB-	AU$28m	(63.5%)	[1.30]	80bp	AU$21m	(63.0%)	[1.29]	90bp
Interest Type	Floating				Floating			
Occupancy Rate	98%				93%			
Weighted Average Unexpired Lease Term:	4.9 years				7.6 years			
Liquidity Facility:	AU$29.5m				AU$25.5m			
Refinance constant:	9.0%				9.0%			
Largest Tenant (% of Net Income):	14%				17.9%			
Property Diversity (Largest single exposure):	AU$200m or 21.48% of portfolio value				AU$222.5m or 28% of portfolio value			
Net Income from Top 10 Tenants:	71%				54%			
Geographic Diversity:								
New South Wales	68%				57%			
Queensland	17%				22%			
Western Australia	15%				6%			
Victoria	-				8%			
Australian Capital Territory	-				7%			
Herfindahl property type index (HHPT):	1.000				0.848			
Herfindahl geographic region index (HHGR):	0.261				0.625			

*Per cent of aggregate market value. Loan-to-Value Ratios (in parenthesis) and Debt Service Coverage Ratios [in brackets]. Coupon rate at basis points (bp) plus 3 months bill swap rate

Source: Standard and Poor's (2005d; 2005e) *and Fitch Ratings (2005a; 2005b) presale reports and author's compilation*

5.3 Property Portfolio

Portfolio composition of the two series is shown below and additional details are shown in Table 7.

Table 7: Multiplex CMBS Issuer Ltd. Series 2005-1&2 Property Portfolios

Multiplex CMBS Issuer Ltd. Series 2005-1

Property	***Location***	***Ownership***	***Occupancy***	***% of Portfolio***	***Market Value (AU$m)***
Goldfields House	Sydney	100	98	21.46	200.00
Jessie Street Centre	Parramantta	100	100	19.32	180.00
NRMA Centre	Sydney	50	100	14.92	139.00
AMP Place	Brisbane	100	87	12.29	114.50
KPMG Tower	Sydney	50	100	12.48	116.25
Bank West Tower	Perth	50	100	9.93	92.50
Ernst & Young Building	Perth	100	93	5.06	47.20
ANZ Centre	Brisbane	50	100	4.54	42.20
Total				**100.00**	**931.65**

Multiplex CMBS Issuer Ltd. Series 2005-2

Property	***Location***	***Ownership***	***Occupancy***	***% of Portfolio***	***Market Value (AU$m)***
Ernst & Young Centre	Sydney	50	88	27.7	222.50
240 Queens Street	Brisbane	100	98	15.9	127.50
15 Blue Street	Nth Sydney	100	100	10.8	87.00
Defence Plaza	Melbourne	100	100	8.1	65.00
111 Alinga Street	Canberra	100	96	6.8	55.00
King Street Wharf	Sydney	100	100	10.1	81.50
Pittwater Place	Sydney	100	86	8.0	64.0
Great Western Super Centre	Brisbane	100	96	6.4	51.0
Carillon City Shopping Centre	Perth	50	88	6.3	50.0
Total				**100.00**	**803.50**

Source: Standard and Poor's (2005d; 2005e)

The portfolio details were used to arrive at geographic and property diversity factors, which were then compared with the sector averages in Table 3.

5.4 Property Risk Assessment

Table 8 presents the results of the property risk assessment of *Multiplex CMBS Issuer Ltd. Series 2005-1* CMBS issue as an example.

Table 8: Property Risk Assessment in Multiplex CMBS Issuer Ltd. Series 2005-1

Property Risk Criteria	***Mitigating Strategy***	***Comments***
Investment Quality:		
Cross collateralisation	8 office buildings	Reduced risk of default as each of the properties support each other in instances of poor performance. Though the portfolio composition is less than the sub-sector average for 2000-2005 of 13, the portfolio's net income is higher than the sub-sector average by 35%.
Over collateralisation	Aggregated market value of AU$931.7m vs. total loan value of AU$537m	The total property value would have to fall under 42% to result in non-payment of principal. Property yields forecast to compress further during loan period (2005-2010) due to the high demand for 'prized trophy' properties and will result in growth in property values.
Occupancy rate	98%	Well above national average of 91.5% as at January 2005 for CBD offices and the sub-sector average for 2000-2005 of 96.4%.
Tenancy Retention	87%	MPT have shown ability to actively manage lease renewals.
LTV (AAA notes)	40.6%	Below the Australian rating parameter for commercial offices of 45%
DSCR (AAA notes)	2.03	Above the Australian DSCR rating parameter for commercial offices of 2.00. Rental growth projected to grow at about 3% over loan period guaranteeing coupon payment.
Liquidity Facility	AU$29.5m or 5.49% of issued debt	Adequate coverage of six months' of note payments and transaction expenses. The sub-sector average for 2000-2005 was 2.2%.
Portfolio Diversification:		
- Asset Type (HHPT)	1	Highly focussed portfolio.
- Property	21.48% of portfolio value	Single property value risk mitigated by 'prized-trophy'status of property.
- Geographic (HHGR)	0.26	Well below the sub-sector average for 2000-2005 of 0.49.
Covenant Strength:		
Credit Quality of Income	71.4%	Low risk of rental default due to the high percentage of credit rated tenants. Sub-sector average for 2000-2005 is 44.3%.
Weighted Average Lease Expiry	4.9 years	1.9 years above loan maturity, added certainty of rental income receipt but falls short of the sub-sector average for 2000-2005 is 5.7 years.
Tenancy Concentration	14%	Well diversified rental income sources. Very favourable in comparison to the sub-sector average for 2000-2005 of 54.2%.
Depreciation and Obsolescence:	Guarantee to maintain assets to investment quality standards	Limited capital expenditure requirements over the medium term as assets are relatively new.

It has been shown that property risk in *Multiplex CMBS Issuer Ltd. Series 2005-1* can be easily compared with set benchmarks and reported using our framework. This is of benefit to guaranteeing investors of their promised principal and interest payments. Other transaction structure features, though not subject of discussion in this paper, such as insurance for full reinstatement, along with public liability and business interruption/loss of rental, borrower collection accounts, interest rate swap provision and tail periods of 18 months to cover refinancing risk further reinforce this.

6.0 CONCLUSION

The success of Australian CMBSs can largely be attributed to high property market transparency and well developed securitisation market. These features and the dominance of issuance by LPTs have contributed to greater assessment and reporting of property risk in CMBSs. However, this has to be done in a more systematic and consistent approach as shown by our property risk assessment and reporting framework. The dominance of CMBSs issuance by LPTs who legally have to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity investors ensures availability of public information on property risk.

Over the study period 2000-2005, investment risk was minimised by composing well diversified portfolios of mainly ‘prized-trophy’ properties as well as utilising conservative loan-to-value ratios and high debt-service-coverage ratios. Weighted average lease expiry profiles in excess of the tenure of the issued notes, adequate tenant concentrations, and ample income from investment-grade tenants, all mitigated covenant strength risk. As for depreciation and obsolescence risk, no standard feature were set though all issues provide for maintenance and capital expenditure reserves to maximise collateral quality, occupancy and value. This information can be used to benchmark property risk assessment and reporting in individual CMBS issues.

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The Development of Commercial Mortgage-Backed Securities in Australia

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Commercial Mortgage-Backed Securities, underlying collateral, credit rating; transaction type, spreads, performance

Abstract

The paper explores the development of the Australian Commercial Mortgage-Backed Securities (CMBS) market from 1999 to 2006 and outlines similarities and dissimilarities with United States (US) and European (EU) CMBS markets. Whilst the US has been the market leader in terms of issuance volumes and diversity of asset classes backing the issues, the other two regions have not lagged far behind and have replicated the US CMBS model to suit their local needs. In comparison to the much bigger US and EU CMBS markets, the Australian CMBS market is well matured as seen by the diversity of asset classes backing the issues and transaction types, tightening spreads, and record issuance volumes. Furthermore, the strong commercial real estate market outlook supports further CMBS issuance, with Listed Property Trusts (LPTs) continuing their dominance as issuers.

1.0 INTRODUCTION

In Australia the description of Commercial Mortgage-Backed Securities (CMBS) has been expanded and accepted in the market to include a form of securitisation of direct property assets (Jones Lang LaSalle 2001), in addition to the traditional definition of the securitisation of commercial mortgages (Jacob and Fabozzi, 2003). The Australian Commercial Mortgage-Backed Securities (CMBS) market has been one of the most dynamic and fastest-growing capital market sector in the last few years

(Richardson 2003). The market has undergone significant development since the first transactions came to the market in 1999, with a range of transaction types and issuers now accessing the market. The first CMBSs in Australia were done by Leda Holdings in 1999, the Longreach/Qantas head office securitisation and the David Jones flagship stores deals in 2000. To date a total of over 60 CMBSs, with nearly 180 tranches totalling over AU$17.4 billion have been issued.

The growth of the CMBS market as a funding source and as an investment option is attributable to its advantages of lower pricing, improved liquidities, diversification on lenders, non-recourse to the parent company, release of value while retaining future growth potential, and off-balance sheet financing in comparison to bank financing. Jones Lang LaSalle (2001) illustrated the potential of CMBSs being a cheaper and alternative debt financing option for companies with property exposure. They further added that CMBSs offered investors advantages of insolvency remoteness, greater diversification, and greater transparency. Roche (2000), Blundell (2001) and Morrison (2001) also stated the advantages of CMBS over traditional bank financing as including cost effectiveness, flexible arrangement, and longer repayment timeframes that closely match the long-term nature of property investment. The Reserve Bank of Australia (2006) also noted that increased supply of CMBS, with a range of subordination, has broadened the investor base in real estate debt markets and reduced the commercial property sector's dependence on bank financing.

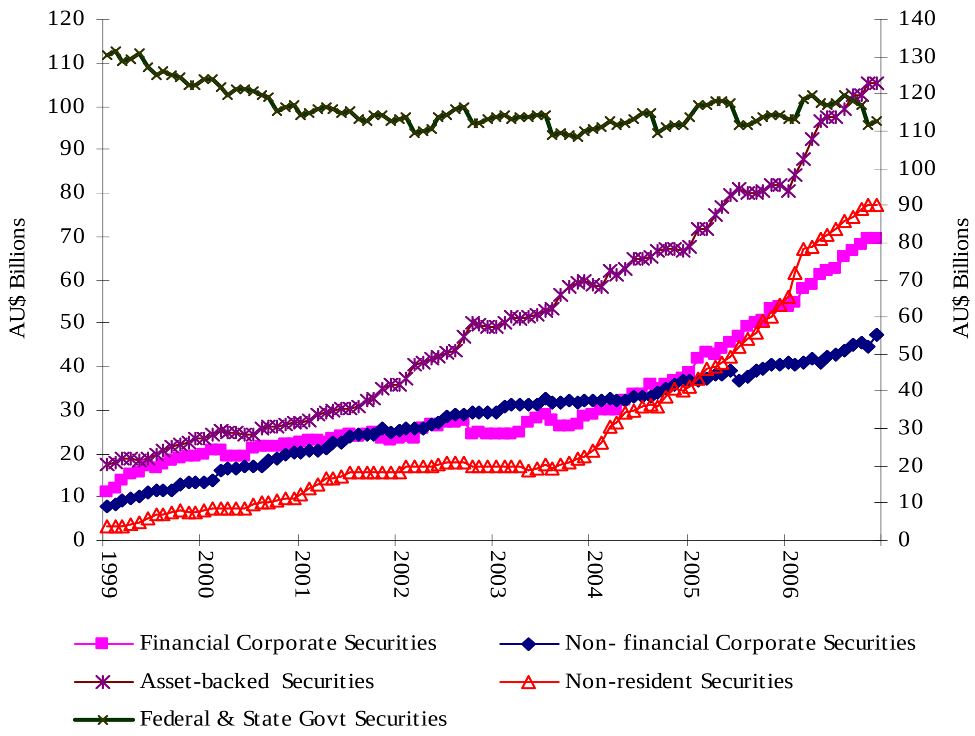
In Australia, the growth of the CMBS market is linked to that of Listed Property Trusts (LPT). The single-purpose-vehicle-like characteristics of LPTs have helped in their establishment as major players in the CMBS market. LPTs continue to be the mainstay of the Australian CMBS market, with 65% of issuance market share. If wholesale funds are included, this figure increases to 75% (Standard & Poor's 2005b). Draffin (2002) attributed the strong interest in CMBS issuance from LPTs to the ability to achieve AAA rating matched by strong investor demand; the cost effectiveness of CMBS debt relative to traditional forms of property finance; and the potential flexibility afforded by structured CMBS debt. Many LPTs used equity capital to fuel growth and expansion during the mid-1990's, but later switched to debt financing in 1997 when the RBA cut interest rates in the second half of 1996, which made debt financing a cheaper option to equity capital (Kavanagh 1997). Jones Jang

LaSalle (2001) predicted the rise of LPT CMBSs on the premise that they had AU$16 billion debt, of which 50% was bank debt. Between 2001 and 2004, LPTs issued CMBSs worth over AU$3.7 billion via 27 issues (eg: Mirvac, Macquarie Goodman Industrial, ING Office, ING Industrial, Investa, Macquarie Office) and bonds worth over $AU4.8 billion via 40 issues (eg: Gandel, Commonwealth Property, GPT, Stockland, Westfield) (Newell & Tan 2005).

This increased participation in CMBS issuance can also be partly attributed to the high demand by institutional investors, mainly superannuation funds, for shares and bonds issued by LPTs in comparison to investing in direct property. The total contribution of asset allocation by Australian superannuation funds to property (both direct and indirect) declined from 17% in 1988 to 9% in 2000-2002, though the contribution of indirect property increased from 3% to 7% over the same period (InTech 2003). In 2005, 95% of superannuation funds had a specific allocation to property (either direct or indirect) averaging 10% (Newell 2006b). The introduction of compulsory superannuation in 1992 saw superannuation funds increase their total assets from only AU$36 billion in June 1984 and AU$238 billion in June 2005 to AU$946 in September 2006 (Australian Prudential Regulatory Authority 2006). Their growth has been underpinned by strong investment returns and new contributions. With the drop in public bond issuance, bonds and CMBSs issued by LPT have been an attractive investment option for superannuation funds. Outstanding government securities fell from AU$130 billion in 1999 to AU$112 billion at the end of 2006. On the contrary, outstanding amounts for other debt securities; in particular asset backed securities[29] increased from AU$17.5 billion to AU$104 billion over the same period. Figure 1 shows outstanding debt securities from 1999 to 2006.

[29] These include commercial mortgage-backed securities

Figure 1: Outstanding Debt Securities (1999-2006)

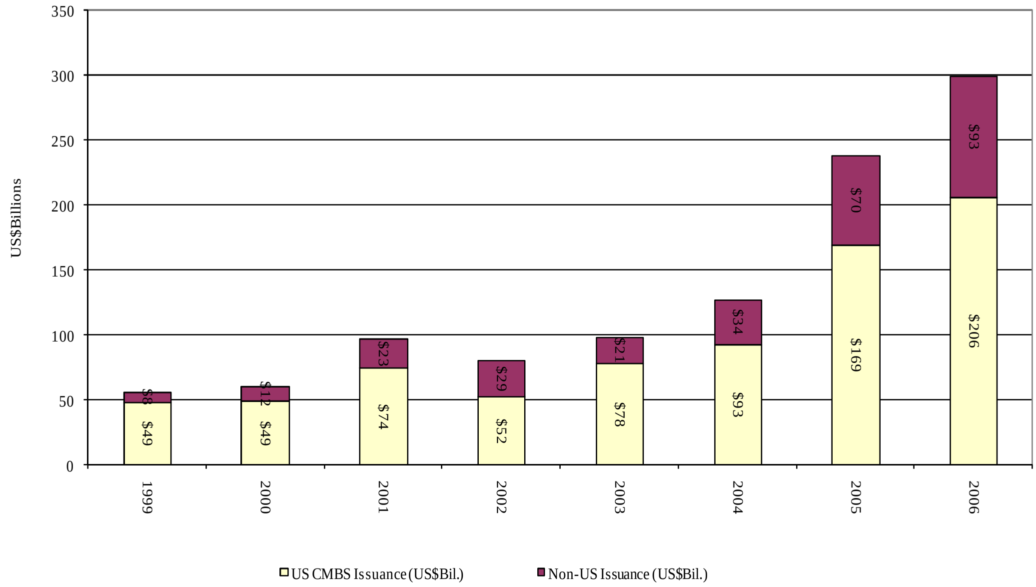


Source: Reserve Bank of Australia (2007)

On a global level, the CMBS market increase is linked to the United States (US) market. For the 1999 to 2006 period, CMBSs totalling over AU $977 billion (US$770 billion)[30] had been issued in the US compared to AU$367 billion (US$289 billion) for the rest of the world. Please see Figure 2. Industry data show that in 2006 issuance of commercial CMBS in the US was around AU$261 billion (US$206 billion), a 22% increase over the previous year, and non-US issues were billion AU$118 (US$93 billion), representing an increase of 34% over the 2005 period (Commercial Mortgage Alert 2007). There was strong activity in Europe (EU) in 2006, where around billion AU$108 billion (€64.75 billion) of CMBS were issued in 2005, with around three quarters of this amount issued in the United Kingdom (UK). In 2006, AU$4.9 billion of newly rated notes were issued in Australia, an increase of 38% on the previous year (Standard & Poor's 2007c).

[30] For ease of comparison, the interbank exchange rates of US$1=AU$1.27 and EUR€1=AU$1.67 as at December 31, 2006 have been used.

Figure 2: CMBS Global Issuance (1999-2006)



Source: Commercial Mortgage Alert (2007)

The 2006 CMBS issuance of AU$261 billion (US$206 billion) in the US, AU$108 billion (€64.75 billion) in the EU and AU$4.9 billion in Australia, represents 40%, 12% and 7% respectively of the overall securitisation markets in these regions (Standard & Poor's 2007b; 2007c). Although these percentages appear to be low except for the US, CMBSs are seen as a good source of funding by issuers and as a good investment option by investors.

As such, given the rapid growth of the Australian CMBS market, the purpose of this paper is to retrace this growth and compare it with that of US and the EU; particularly focussing on market structure and issues details. Furthermore, the paper presents a future outlook of the Australian CMBS market.

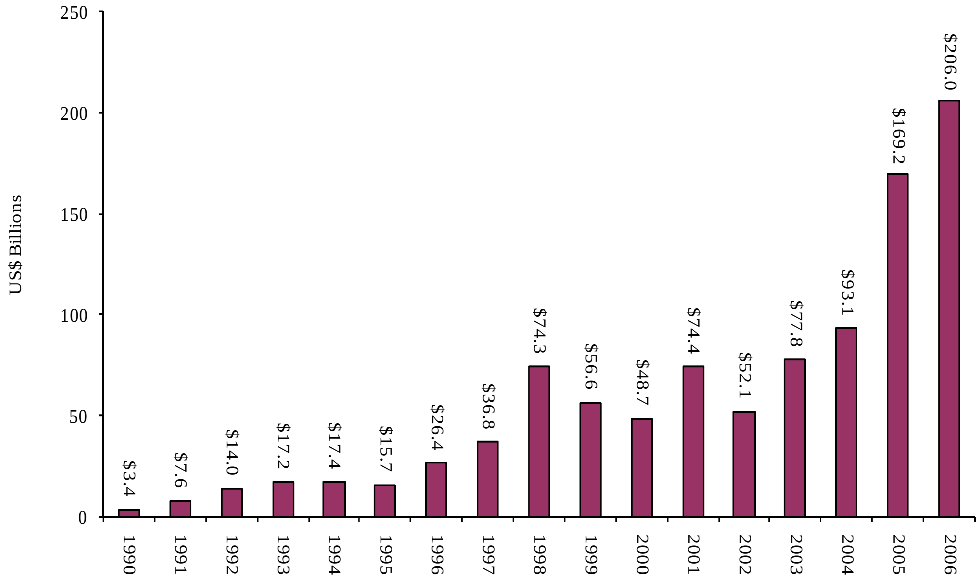
2.0 SIGNIFICANCE OF COMMERCIAL MORTGAGE BACKED SECURITIES

The significance of the CMBS market is best illustrated by looking at developments in the bigger US and EU markets. Comparing with developments in the US and EU markets aids the analysis of how the Australian CMBS market has evolved.

2.1 US CMBS Market

The US has been leading the way in global issuance of CMBSs. For the period 1990 to 2006, CMBSs totalling over AU$1257 billion (US$990.7 billion) had been issued in the US. Figure 3 shows the total amount of CMBS issuance per year since 1990.

Figure 3: US CMBS Issuance (1990-2006)

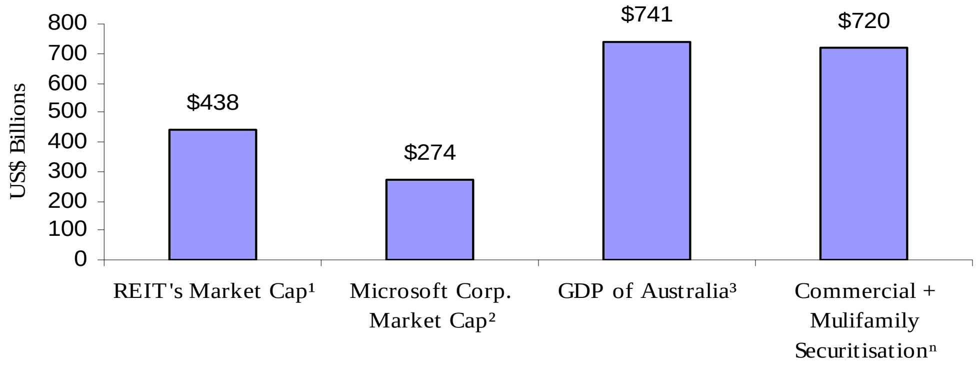


Source: Commercial Mortgage Alert

US CMBS issuance rose from AU$4.3 billion (US$3.4 billion) in 1990 to AU$261 billion ($US$206 billion) in 2006. As of the second quarter of 2005, there was AU$596 billion ($470 billion) worth of CMBS outstanding in the US market, representing around 40% of the overall asset-backed securities market and around 20% of the overall commercial loan market.

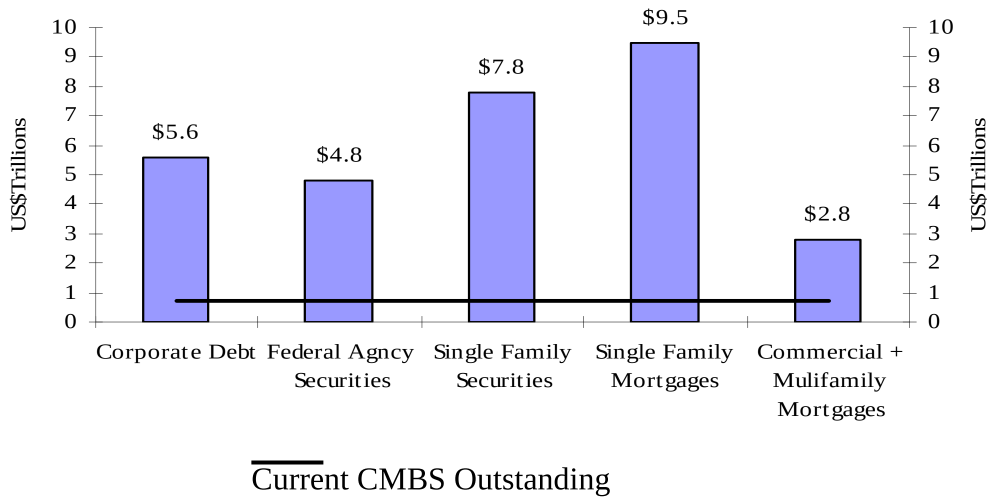
Figure 4 shows market size of commercial and multifamily securitisations ($720 billion) with that of REITs ($438 billion market cap), Microsoft ($274 billion market cap on the New York Stock Exchange) and the GDP of Australia ($720 billion). The $720 billion worth of commercial and multifamily securitisations outstanding only represents about 26% of commercial and multifamily mortgages that have been issued (Figure 5). This further shows the growth potential of this investment class.

Figure 4: Market Comparison (as of December 31, 2006)



Source: (1) NAREIT; (2) Microsoft Website(3) The Economist, January 3, 2007 (n)Federal Reserve, Flow of Funds

Figure 5: Market Comparison (as of September 30, 2006)



Source: Federal Reserve, Flow of Funds

According to Commercial Mortgage Alert (2007), retail collateral has commanded roughly a 25% share of issues by value for several years. The multi-family sector has declined in its share as office properties have increased in importance. The industrial and hotel property types have retained relatively small, but significant shares.

Since 1993 the proportion of issues carrying triple-A ratings has increased steadily, largely as a result of a number of improvements throughout the CMBS market. Originators and issuers have improved underwriting, documentation, and marketing, which have helped to improve the average loan quality. Rating agencies have improved the rating process with more sophisticated models incorporating more historical performance data, thereby providing a better guidance on risk. Property market fundamentals have remained healthy; and the market for CMBS has deepened, particularly for highly rated securities such as triple A rated CMBS, encouraging an increase in their supply. This trend is also driven in part by the shallow market for lowest grade CMBS tranches[31], a chronic condition that exerts significant influence on both the public and private real estate debt markets.

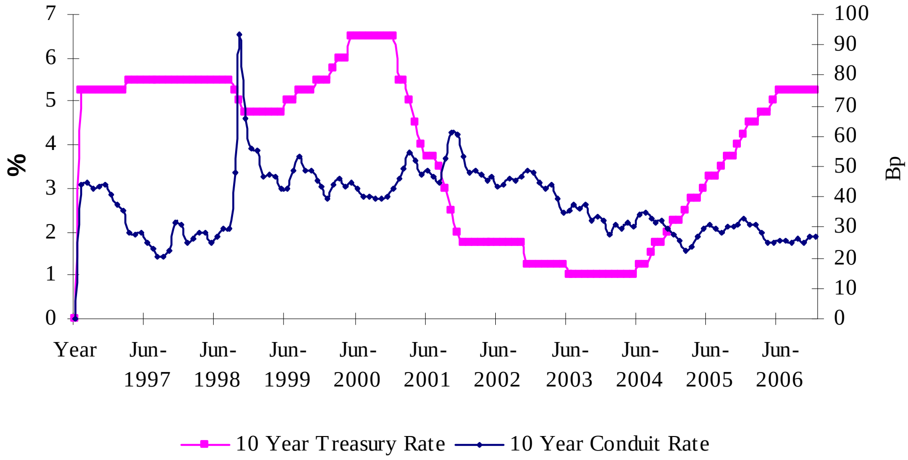
The last three years (2004-2006) have seen a predominance issuance of floating rate notes. In 2006 81% of the issues were floating rate notes representing an increase of 1.2 % and 4.9% over 2005 and 2004 respectively.

The US CMBS market is dominated by conduit/fusion transactions[32]. In 2006 they accounted for 88% of the outstanding CMBS issuance, and the large loan deals for the remaining 12% (Standard & Poor's 2006e). For analytical purposes, re-REMICS, CRE CDOs, and corporate-dependant deals have been included in the above two categories due to their special collateral characteristics.

Conduit transactions have had strong investor appeal has evidenced by contraction in spreads. Figure 7 shows the 10-year fixed conduit spreads between 1996 and 2006. The earlier years saw upward movements in annual average spreads of between 44 basis points (bp), and 53 bp, with the exception being 1998 which recorded a high of 111 bp. However, after 2001 there has been a fall from a high of 53 bp to just less than 30 bp as at the end of 2006 (Commercial Mortgage Alert 2007).

[31] Tranching involves issuance of several classes of securities against a pool of assets, each with distinct risk-return profiles.
[32] CMBS backed by reasonably large, well diversified pools of small-to medium-sized and large-sized secured property loans.

Figure 6: 10-Year Fixed Conduit Spreads and 10-Year Treasury Rate



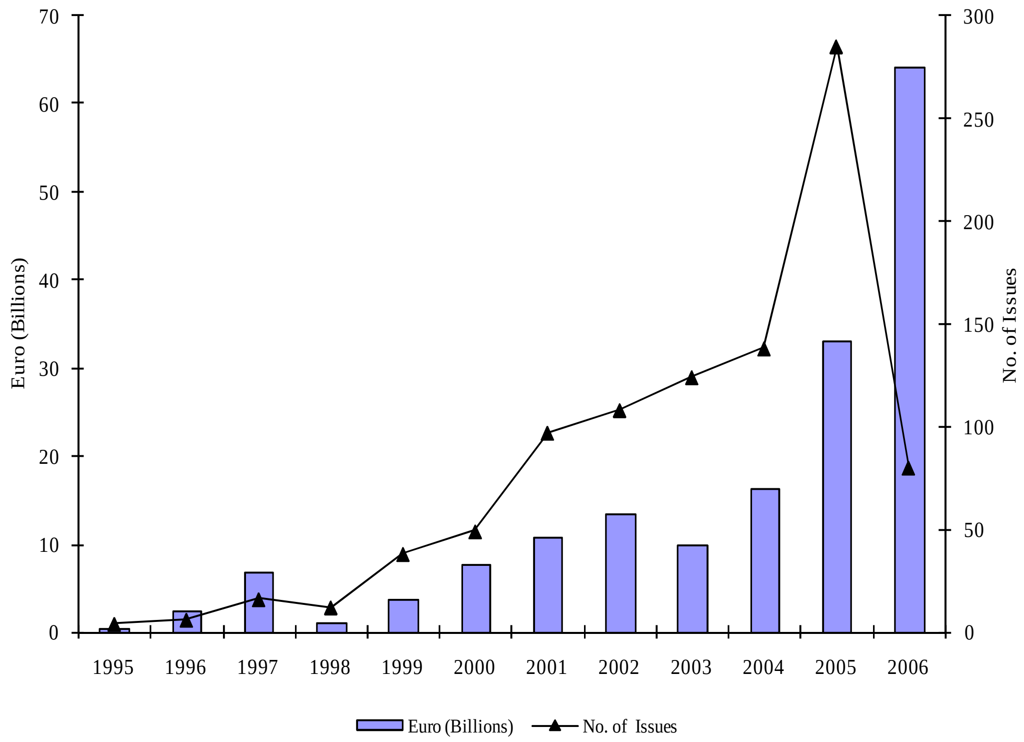
Source: Commercial Mortgage Alert

According to Fitch Ratings (2007d) by the end of 2006, the ratio of upgrades to downgrades was 34:1 (the highest ratio for structured finance products). Of the nearly 5000 CMBS deals they rated, the surveillance group upgraded 1,781 tranches and downgraded 52. Credit rating upgrades depict mainly an improvement in the performance of the underlying asset backing a CMBS issue and downgrades the opposite.

2.2 EU CMBS Market

EU CMBS issuance in 2006 was AU$108 billion (€64.75 billion), an increase of 39% on 2005 levels. The number of transactions increased to 80, from 64 (Standard & Poor's 2007b). Between 1997 and 2004, more than AU$129 billion (€77 billion) was raised from 124 transactions. Figure 7 shows and historical overview of annual issuance.

__Figure 7: EU CMBS Issuance 1995 – 2006__



Source: Barclays Capital

The UK has been traditionally the dominant jurisdiction in EU CMBS issuance, accounting for 74% in 2004. Germany is rapidly catching up, with multifamily deals making up 23% of all CMBS and 29% of conduit deals in 2006 (Structured Finance International 2006).

In terms of asset composition, office and retail properties continued to form the dominant collateral security in 2006 at 31% and 28%, respectively. The residential sector emerged as a leading collateral security in 2006, mainly driven by securitisations of loans secured by German multifamily portfolios; it increased from 15% in 2005 to 23% in 2006 (Moody's Investor Service 2007a).

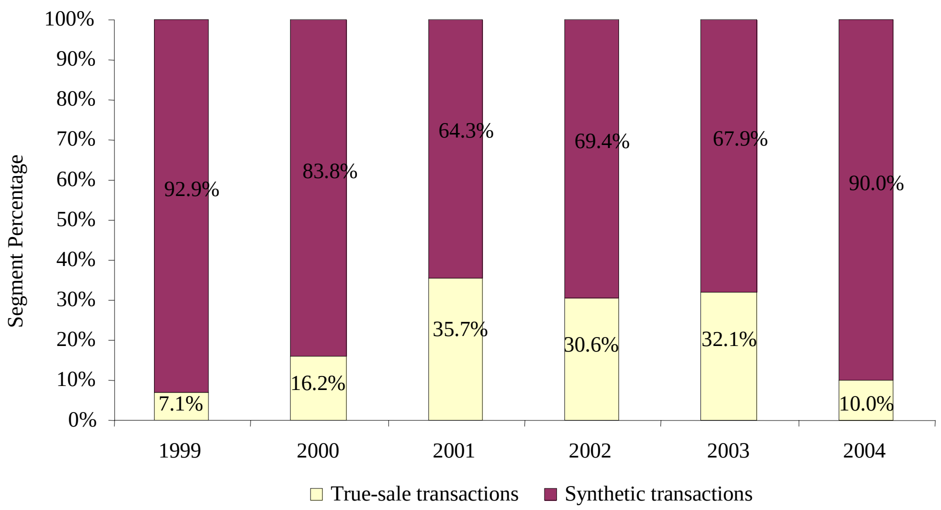
By 2005 EU CMBS issuance was largely in the AAA rating category with 60% of the total and AU$7.5 billion (€4.5 billion) worth of non-investment grade CMBS issued from 2000.

Vresen (2005) points out that the majority of EU CMBS issuance from 2000 to Q1 2005 were floating notes averaging at 73%.

No single transaction type made up a majority issuance mainly due to a wide range of legal structures to accommodate each of the transaction types. However, the single largest transaction type was the single-borrower single-property transaction with 28% of the total issuance to the end of 2004. Together with the single borrower and multi borrower property categories made up 605 (68.8%) of the 879 issues as at end of 2005 (Vresen 2005).

EU CMBS transactions are generally grouped into three segments: true-sale single borrower[33], true-sale multiple borrower[34], and synthetic transactions[35]. Figure 8 shows the dominance of true-sale transactions form 1999-2004. True-sale multiple borrower transactions comprised 68% and 42.3% of all true-sale transaction in 2003 and 2004 respectively (Moody's Investor Service 2005).

Figure 8: EU CMBS Volume by Structure Category (1999-2004)



Source: Author's compilation from various Moody's Investor Service EU CMBS Year-end and Outlook Reports

[33] True-sale borrower (single property, multiple-property, liquidating pool, credit tenant lease)
[34] True-sale multiple borrower (single property and multiple property)
[35] Synthetic transactions are typically funded through the sale of credit linked notes

Spreads tightened by approximately 60% in the last three quarters of 2004. In July 2004 the market saw AA spreads at around 40 bp, with two recent first quarter 2005 transactions closing at 17 bp for the AAA classes. This implied a 57.5% tightening in AAA over the last three quarters. Furthermore, the BBB class saw spreads at 200 bp in July and in the first quarter of 2005 at around 75%. This implied a 62.5% tightening at BB over the last three quarters. As a result, the difference between AAA and BBB spreads narrowed from 160 bp to only 58 bp, a 64% reduction (Vresen 2005). Obviously, lower spreads mean that bond investors are not being compensated as they were for similar risk. On the other hand, it also means that costs of funds for originators and borrowers are lower, making CMBS even more attractive as a financing source.

According to Vresen (2005), EU CMBS showed the best upgrade performance in 2004 of any major EU ABS sector, with 7.6% of the ratings being upgraded. This compares with an average upgrade in EU ABS of 4.5%. The 2004 CMBS downgrade-to-upgrade ration was 0.4, just behind residential mortgage backed securities and consumer ABS, both which saw downgrades in 2004. Moody's (2007b) reported 2006 EU CMBS upgrades at 8% and downgrades at 2.1%.

3.0 METHODOLOGY AND DATA

All CMBS presale reports from 1999 to 2006 as found in Standard and Poor's Ratings Direct database were assessed. During this period, a total of 65 issues with over 180 tranches, worth over AU$14.8 billion were issued; this represents 100% of all the CMBS issued to 2006, excluding credit lease and small ticket transactions. These generic CMBSs which are single-borrower and multi-borrower transactions accounted for 62% of all the CMBS issuances in 2005 (Standard & Poor's 2005a). Credit lease and small ticket transactions are not discussed in this paper. Tables 1 and 2 show some of the major CMBS issues and some of the major properties in the portfolios backing these issues respectively.

Table 1: Major Australian CMBS Issues

No.	*Issue Date*	*Sector*	*Issue*	*Transaction Type*	*S&P Rating*	*Issued Amount (AU$m)*	*Coupon Type*	*Coupon/ BBSW+*	*Scheduled Maturity*	*DSCR***	*LTV***	*Security*
1	Apr-01	Office	CPIT 2006 Aurora Bonds	Single-borrower single-property	Aaa*	150	Floating	41	Mar-06	2.0	32%	ABN AMRO Office Tower with a total portfolio value of AU$713 million
2	Jun-01	Diversified	Mirvac Capital Pty Ltd - Series 2001-1	Single-borrower multi-property	AAA	150	Fixed	6.50%	Jun-06	2.2	40%	25 modern, investment-grade buildings in the office, hotel, retail, industrial & carpark sectors with a total portfolio value of AU$1,430 million
					AAA	350	Floating	41	Jun-06	2.2	40%	
3	Feb-02	Office	ING Office Finance Pty Ltd	Single-borrower multi-property	AAA	230	Fixed	6.25%	Feb-07	2.4	39%	18 commercial office properties with a total portfolio value of AU$1,215 million
					AAA	178	Floating	40	Feb-07	2.4	39%	
4	Jun-02	Diversified	Challenger Capital Markets Ltd	Multi-borrower multi-property	AAA	100	Fixed	6.00%	Jun-05	2.7	32%	25 retail, office, industrial, cinema and car park properties with a total portfolio value of AU$798 million
					AAA	120	Floating	40	Jun-05	2.7	32%	
					A	61	Fixed	6.50%	Jul-05	1.8	48%	
					A	54	Floating	80	Jul-05	1.8	48%	
					BBB+	55	Floating	100	Jul-05	1.5	56%	
					BBB	17	Fixed	6.75%	Jul-05	1.4	60%	
					BBB	10	Floating	130	Jul-05	1.4	60%	
					NR	99	Floating	P	Jul-05	2.7	32%	
5	Nov-03	Retail	ALE Finance Company Pty Ltd - Series 1	Whole-business	AAA	100	Fixed	6.60%	Nov-08	3.1	43%	101 pub assets with a total portfolio value of AU$562 million
					AAA	110	Floating	47	Nov-08	3.1	43%	
					AAA	45	Floating	90	Nov-08	2.2	60%	
					AAA	35	Floating	120	Nov-08	1.8	71%	
					AA	40	Floating	67	Nov-08	2.6	51%	

No.	***Issue Date***	***Sector***	***Issue***	***Transaction Type***	***S&P Rating***	***Issued Amount (AU$m)***	***Coupon Type***	***Coupon/ BBSW+***	***Scheduled Maturity***	***DSCR*****	***LTV*****	***Security***
6	May-05	Office	Multiplex MPT CMBS Series 2005-1	Single-borrower multi-property	AAA	343	Floating	20	May-08	2.0	40%	8 commercial properties with a total portfolio value of AU$932 million
					AA	61	Floating	30	May-08	1.7	47%	
					A	54	Floating	40	May-08	1.5	53%	
					BBB	51	Floating	57	May-08	1.4	59%	
					BBB-	28	Floating	80	May-08	1.3	62%	
7	May-05	Diversified	Multiplex MPT CMBS Series 2005-2	Single-borrower multi-property	AAA	298	Floating	25	May-10	2.0	40%	5 commercial and 4 retail properties with a total portfolio value of AU$804 million
					AA	53	Floating	40	May-10	1.7	47%	
					A	39	Floating	50	May-10	1.5	52%	
					BBB	52	Floating	75	May-10	1.4	59%	
					BBB-	21	Floating	90	May-10	1.3	62%	
8	Dec-06	Office	Series MCWF 2006-1	Single-borrower multi-property	AAA	320	Floating	19	Jun-11	1.8	44%	52 retail centres with a total portfolio value of AU$802 million
					AA	50	Floating	23	Jun-11	1.5	51%	
					A	25	Floating	27	Jun-11	1.5	54%	
					BBB	30	Floating	47	Jun-11	1.4	58%	
					BBB-	15	Floating	57	Jun-11	1.3	60%	
9	Dec-06	Office	WOT CMBS Pty Ltd Series 1	Single-borrower multi-property	AAA	320	Floating	26	May-11	N/K	N/K	2 office buildings, 1 retail building and 1 university building with a total portfolio value of AU$
					AA	45	Floating	31	May-11	N/K	N/K	
					A	90	Floating	41	May-11	N/K	N/K	
					BBB	50	Floating	61	May-11	N/K	N/K	
10	Dec-06	Retail	Centro Shopping Centre Securities - CMBS Series 2006-1	Conduit	AAA	250	Floating	19	N/K	1.8	43%	13 mortgage facilities secured against 47 retail properties and 1 retail distribution centre with a total portfolio value of AU$1,580 million
					AAA	300	Floating	24	N/K	1.8	43%	
					AAA	170	Floating	18	N/K	1.8	43%	
					AA	37	Floating	28	N/K	1.8	45%	
					A	62	Floating	40	N/K	1.8	49%	
					BBB	53	Floating	65	N/K	1.8	52%	
					BBB-	28	Floating	85	N/K	1.8	54%	

N/K: Not Known

Source: Author's compilation from various Standard and Poor's CMBS presale reports

Table 2: Major Properties in Australian CMBS Issues

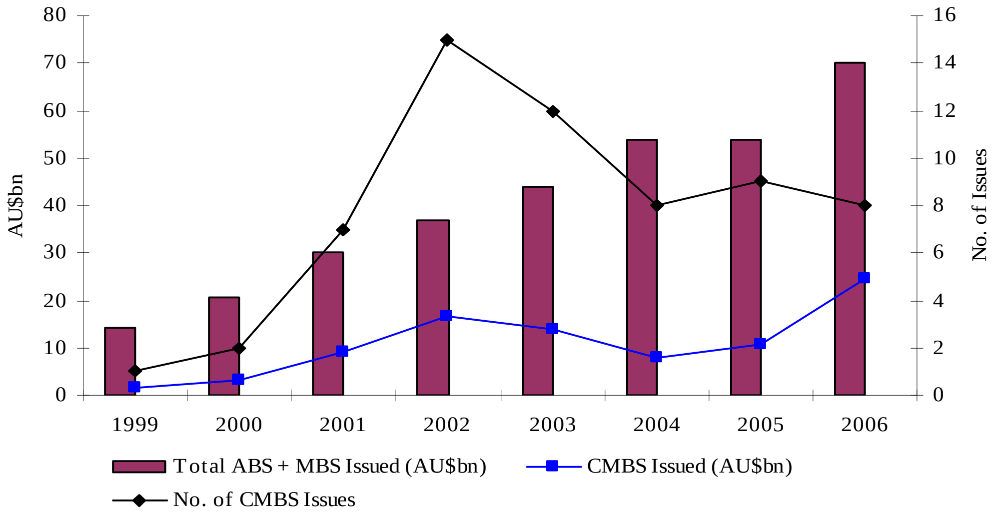
Sector	Issue	Date of Issue	Major Property in Issue	Property Value (AU$ m)
Office	CPIT 2006 Aurora Bonds	Apr-01	ABN AMRO Tower	$495
Office	Deutsche Office Finance 2004-CMBS Trust	May-04	Governor Phillip Tower and Governor Macquarie Tower, Sydney NSW	$478
Retail/Office/Hotel	Quay 62 Pty Ltd Series 2005-1	Apr-05	Collins Place, 25-55 Collins Street, Melbourne VIC	$425
Retail	Quay 62 Pty Ltd Series 2003-1	Oct-03	Southland, VIC	$350
Office	Mirvac Capital Pty Ltd	Jun-01	The Optus Centre, Miller St NSW	$330
Retail	Deutsche Office Finance 2004-CMBS Trust	May-04	Southgate Complex, Melbourne VIC	$316
Retail	Centro Shopping Centre Securities Limited - CMBS Series 2006-1	Jun-06	Centro Galleria, WA (50%) & Centro Goulburn, NSW (50%)	$299
Retail	Quay 62 Pty Ltd Series 2003-1	Oct-03	Pacific Fair, Broadbeach	$292
Industrial	Deutsche Industrial Finance 2002 - CMBS Trust	Dec-02	DB Office Park, North Ryde NSW	$103
Industrial	Macquarie Goodman Industrial Finance Pty Ltd.	Nov-01	City West Office Park, Pyrmont NSW	$93

Specific details obtained per CMBS issue were on issue size, underlying collateral, rating tranche distributions, interest rate types and transaction types. Details on CMBS market size, spread trends, and performance of the issues were obtained from other secondary sources. All these were used to assess how the market had developed and to compare and contrast with that of the US and EU. A cogent review and explanation of these features will help to understand the changing nature of the Australian CMBS market. Using the historical approach, a researcher endeavours to record and understand events of the past. In turn, interpretations of recorded history hold to provide better understanding of the present and suggest possible future directions (Baumgarter & Hensley 2005).

4.0 ANALYSIS OF AUSTRALIAN COMMERCIAL MORTGAGE BACKED SECURITIES

The overall cumulative Australian CMBS issuance since 1999 reached AU$17.5 billion at the end of 2006. In 2006 a record number of new issuances exceeding AU$4.9 billion were issued, passing the earlier issuance record year of 2002 (AU$3.7 billion)(Standard & Poor's 2007c). The years 2003 and 2005 produced stable issuances of over AU$2 billion per year. In 2004 there was a slight fall in issuances to AU$1.6 billion. Figure 9 shows the volumes of CMBS issuance since 1999 in dollar amount and number of issues per annum. It also shows the size of the CMBS issues in relation to the overall asset backed securities market. The total ABS issuance in the year 2006 was AU$70 billion, of which the CMBS sub-market accounted for 7%. This represents a significant leap from 2% of the $14.4 billion ABS total issuance in 1999 (Fitch Ratings 2007b).

Figure 9: Australian Annual ABS/MBS/CMBS Issuance Volumes

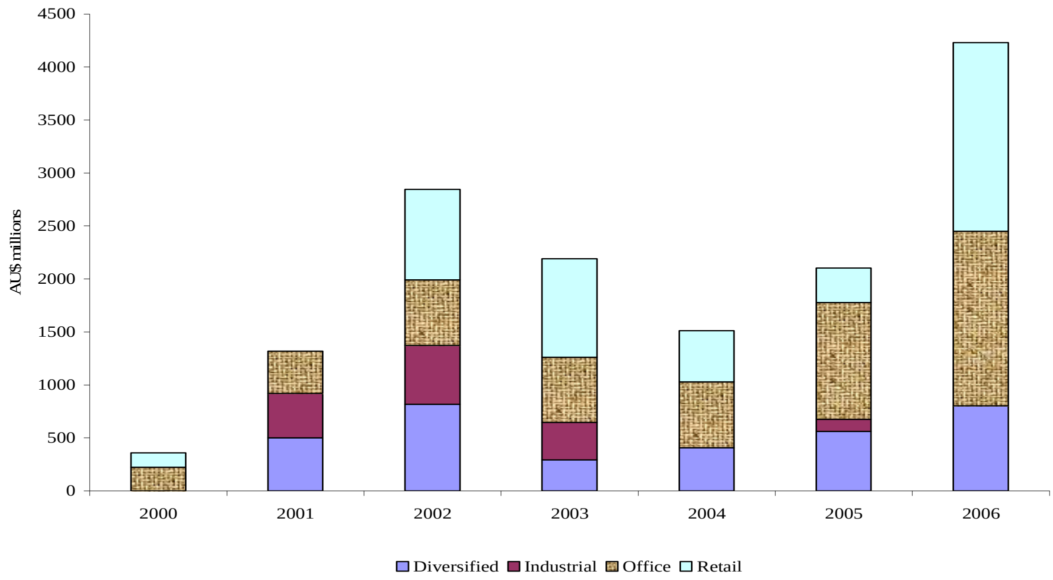


Source: Standard and Poor's(2006a)

The last three years has seen average number of issues of eight which is lower than the record number of issuances of fourteen in 2002. However, the size of issues has been increasing. For instance, all the new issues in 2006 each had a combined tranche value of over AU$400 million. Furthermore, the last two years have seen record issue sizes with AU$1 billion for Multiplex MPT CMBS Series 2005-1&2 in 2005 and AU$900 million for Centro Shopping Centre Securities - CMBS Series 2006-1 in 2006.

Figure 10 presents CMBS issuance by sector from 2000 to 2006, excluding credit lease and small ticket transactions. Over this six year period, the most dominant CMBS issues have been in the office sector (AU$5.2 billion), followed by the retail sector (AU$4.5 billion). The diversified sector and the industrial sector have had AU$3.4 billion and AU$1.4 billion worth of CMBS issuance respectively.

Figure 10: Australian CMBS Issuance by Sector (2000-2006)



Source: Author's compilation from Standard and Poor's presale reports

Over 2000-2006, diversified backed issues had the most tranches at 31%, followed by retail backed issues at 28% and office at 23%. The least number of tranches were in the industrial backed issues at 18%. This is shown in Table 3.

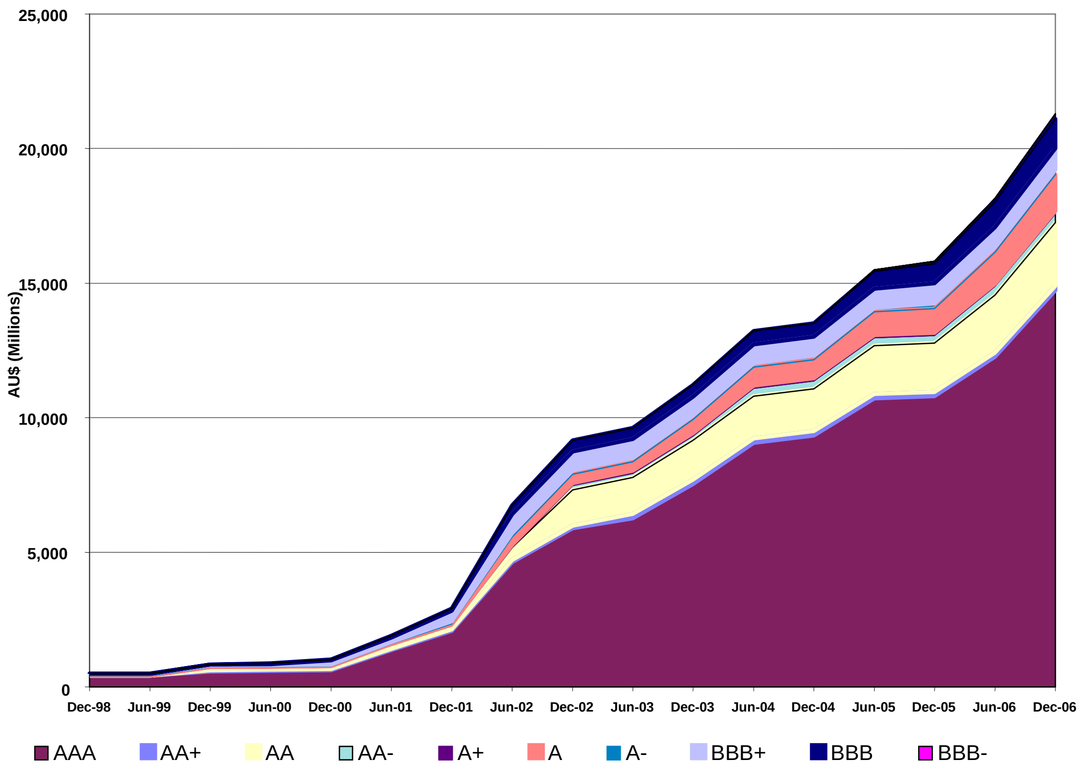
Table 3: Number of Tranches in Australian CMBS Issues (2000-2006)

Sector	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2000-2006*	*% of Total*
Diversified	1	2	11	7	7	14	13	55	31%
Industrial	4	3	6	12	4	3	0	32	18%
Office	0	3	4	5	9	10	11	42	23%
Retail	0	0	15	9	0	8	18	50	28%
Total	5	8	36	33	20	35	42	179	100%

Source: Author's compilation from Standard and Poor's presale reports

Majority of the tranches have been A-class rated though lower B-class tranches are becoming common as well (Figure 11). This shows the growth/maturing of the market, increased acceptance of the investment asset and the increased participation of more knowledgeable investors.

Figure 11: Australian CMBS Issuance by Tranche Type and Amount (1998-2006)



Source: Standard and Poor's (Standard & Poor's 2006a)

A combination of both fixed-interest and floating-rate notes have been issued to attract a broad spectrum of investors. In the earlier year floating rate notes and fixed rate notes were issued in equal proportions. However, the last few years have been predominated by floating rate notes. For instance, in 2005, 68% were floating rate notes in comparison to 32% fixed rate notes.

Majority of the issues are in the single borrower multi-property category with over 95% of the total issuance to date. The CPIT 2006 Aurora Bonds CMBS issued in April 2001 is the only single borrower single-property issuance to date being for a single Sydney CBD office property. Two multi-borrower multi-property issues have been by MCS Capital Pty Limited issued in May 2002 and Challenger Capital Markets Ltd issued in June 2002. ALE Finance Company Pty Ltd - Series 1 CMBS issued in first in November 2003 and its tap issue in April 2006, is the only whole-business CMBS to date.

The year 2006 saw the introduction of the first Australian conduit-style CMBS common in the US, Centro Shopping Centre Securities Ltd, CMBS Series 2006-1. This AU$900 million transaction is the securitisation of a portfolio of 13 non cross-collateralised and non cross-defaulted real estate backed debt facilities to 12 obligators. Each financing is backed by between 1 and 11 retail properties located in major Australian cities and regional centres. The total independent value of the asset-backing the issue was AU$1.67 billion

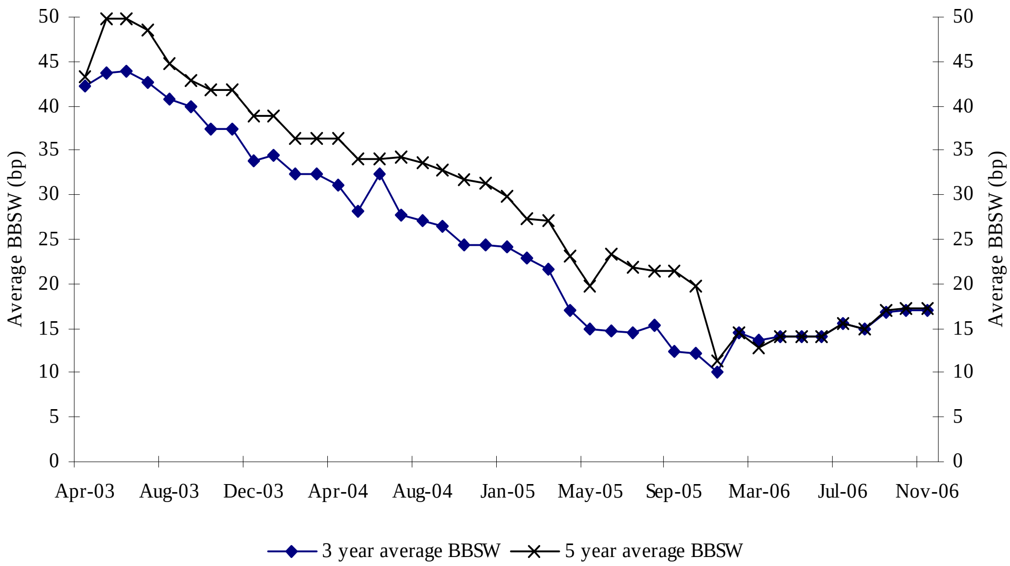
The diversity of issuance transaction types show the maturity of the market as well as the arranger's confidence in trying out various CMBS structures to suit market needs.

These deals are structured on a 'secured loan'[36] basis unlike other parts of the world where they are done on a 'true-sale' basis. A possible explanation is the predominance of Listed Property Trusts in the CMBS market, having a 65% market share (Standard & Poor's 2005b). LPTs' core business is real estate investment and retaining control of the securitised assets is critical to their survival.

[36] This involves "selling" assets to a special-purpose "bankruptcy-remote" entity that, in turn, pledges the assets as collateral for a loan and then conveys the borrowed funds to the "seller" as consideration.

Given the general appetite for fixed-income securities and the limited supply in the market, CMBS credit spreads were contracting until the end of 2005 and have been stable since the start of 2006 as shown in Figure 12. In 2005 'AAA' five-year, interest only notes were priced at 20-25 bps (basis points) over three month bank bill swap (BBSW), and three-year, interest-only notes at 17-20 bps over three-month BBSW. 'BBB' were priced at 60-95 bps over BBSW. These margins were lower than those of 2002, when they were priced at least 20 bps wider for 'AAA' and 60 bps wider at 'BBB' level. At the beginning of 2006, both 'AAA' five-year and 'AAA' three-year were trading at average ranges of 8-10 bps; as at the end of 2006 they were trading at average ranges of 15-17 bps.

Figure 12: AAA Rated CMBS - Average Industrial Spread to Swap (April 2003-November 2006)



Source: Author's compilation from Property Australia magazine

Over the past three years (2003-2006), there were more upgrades than downgrades buoyed by improvements in property performance. Stable property markets continue to be reflected in steady cash flows and occupancy trends. No rating changes were experienced throughout the second half of 2005. Of the six rating changes in 2006, three upgrades resulted from improved property performance and the three downgrades resulted from lowering of a support party rating. The year 2006 also had fifteen rating affirmations (Standard & Poor's 2007c). Table 3 shows the total number of upgrades and downgrades between 2003 and 2006.

Table 4: CMBS Upgrades and Downgrades

Year	*Upgrades*	*Downgrades*	*No. of Ratings*
2003	1	1	135
2004	4	0	136
2005	0	1	134
2006	3	0	136
Total	8	2	541

Source: Standard and Poor's (2006)

5.0 FUTURE OUTLOOK OF AUSTRALIAN CMBS

The following support continued dominance of LPTs in CMBS issuance:

- ▪ Their structure and single-purpose nature have been well established and accepted in the market. Only about a third of the 48 LPTs have issued CMBSs. The others are yet to utilise them as funding sources.
- o Of the AU$116 billion (68% market coverage) institutionally owned property in Australia, LPTs contribute AU$75 billion (61% of total) (Higgins 2006). These assets are best suited for securitisation due to their high capital values and stable cash flows.
- o The low gearing levels in comparison to the US (Newell & Tan 2005) present possibility for further issuance of debt securities via CMBS. Australian LPTs had an average gearing level of 42.1%, whereas their US counter-parts (Real estate Investment trusts) had levels higher than 50% (BDO Chartered Accountants & Advisers 2006).
- o The provision to buy and sale collateral assets in CMBS portfolios supports market growth though 'tap' issuances. In 2006, over 80% of activity came

from tap issues, refinancing and restructurings from existing sponsors (Efrat 2006).

- The insatiable demand alluded to earlier by superannuation funds for fixed income issued by LPTs.

Many industry experts are divided on the role that unlisted property trusts will play in growth of the CMBS market (Efrat 2006). Some contend that unlisted property trusts have become sophisticated and have outgrown their existing financing mechanisms and that CMBS are an alternative debt funding tool for them. However, others have highlighted that the higher unlisted property trust gearing levels would entail issuance of lower rated tranches, for example, double B and lower which are not favourable for both issuers and investors.

The launch of Centro Shopping Centre Securities - CMBS Series 2006-1 in 2006 marked a milestone in the Australian CMBS market. Being the first such multi-borrower program, it is anticipated that momentum for other similar issues will come from small to medium enterprises and the loans this sector has sitting on bank's books, most of which hasn't historically been securitised. As at June 2006, total commercial property exposure by all banks was AU$94.5 billion, with 0.4% and 0.2% classified as nonperforming and impaired[37] respectively (Reserve Bank of Australia 2006). Banks have generally been reluctant to securitise their commercial property loans due to the low default rates as shown in Table 5.

[37] Assets on which payments are in arrears by more than 90 days or otherwise doubtful and the amount due is not well covered by the value of collateral. The remainder of these assets were in arrears, but were well covered by collateral.

Table 5: Australian Commercial Bank Property Exposure

Sector	***Commercial Property Exposure- All Banks (%)***	***Share of Total Commercial Lending (%)***	***Impaired Assets Share of Commercial Property Exposure (%)***
Office	25.5	10	0.1
Retail	18.5	7	0.1
Industrial	10.7	4	0
Land Developments/subdivisions	10.8	*	*
Residential	17.8	11	0.4
Tourism and leisure	4.4	2	0.1
Other	12.3	4	0.2
Total	100	37	0.2

Source: Reserve Bank of Australia (2006); Australian Prudential Regulatory Authority (2006)

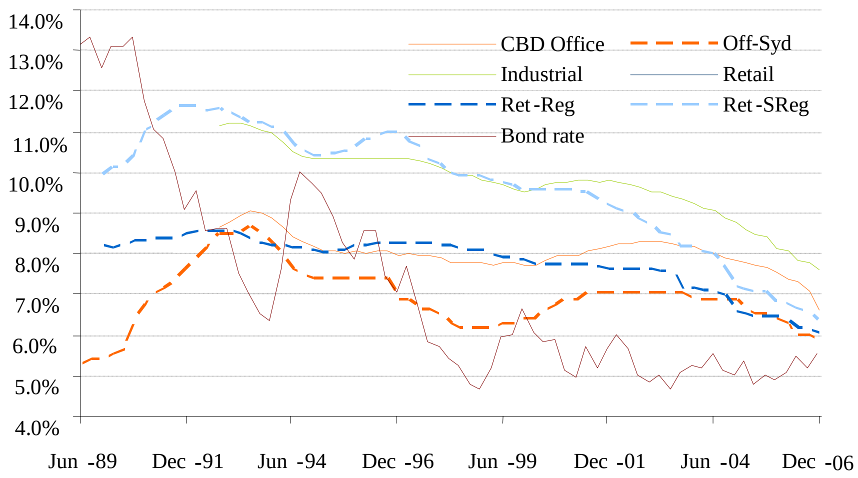
The strong commercial real estate market outlook supports further CMBS issuance. Investors in real estate have been rewarded with strong returns with both direct property and LPTs outperforming shares and bonds over a ten-year period to Q4.2005; see Table 6 (PCA/IPD 2007; UBS 2007). This has reinforced the importance of real estate as an asset class in its own right leading to sustained demand for real estate as evidenced by continued yield compression. Figure 13 shows yield trends in retail, office and industrial sectors from 1991 to 2006. These trends are expected to continue due to the limited number of ‘investment-grade’ properties (Murdoch 2004) and the huge amounts being allocated to property investment, as alluded to earlier. The future outlook of various property sectors is positive: there is strong economic outlook and investor sentiment for industrial property (Jones Lang LaSalle 2006c; Newell & Peng 2007a); continued catalysts to growth in retail property of strong rental growth, stable income streams, favourable planning environment limiting new supply and undue competition, and strong investor support (Burdekin & Snoswell 2004); and further office market growth underpinned by strong economic growth. Australia is ranked as the sixth most competitive country in the world (IMD 2006) and Sydney ranks highly at 46 in CB Richard Ellis' Global Market Rents Report of November 2006 (CB Richard Ellis 2006). Sydney and Melbourne also feature prominently among major Asia-Pacific cities at sixth and tenth respectively in Jones Lang LaSalle's Asia Pacific Property Digest (Jones Lang LaSalle 2006a). Generally, office markets across Australia have performed well, with record sales activity and rental growth in Perth and Brisbane.

Table 6: Asset Class Performance Q4:2006

Asset Class	***Average Annual Return (%)***			
	1Y	***3Y***	***5Y***	***10Y***
Direct property	17.29%	14.48%	12.96%	11.68%
Office	17.76%	12.21%	10.24%	10.14%
Retail	17.67%	16.40%	15.40%	12.84%
Industrial	13.43%	12.91%	13.27%	13.59%
LPTs	25.90%	19.40%	16.10%	16.07%
Office	19.60%	13.00%	11.80%	10.80%
Retail	28.10%	20.50%	18.10%	16.40%
Industrial	36.20%	27.20%	20.40%	17.80%
Shares	20.50%	15.50%	13.10%	13.11%
Bonds	5.30%	5.50%	6.50%	6.33%

Source: PIR (2007); UBS (2007)

Figure 13: Australian Commercial Property Yields (1989-2006)



Source: JLL, and CFS Research

6.0 CONCLUSION

Understanding global CMBS trends is important for investors and issuers. The globalisation of financial markets has seen the developments in the US CMBS market replicated in other parts of the world, albeit with some adaptation to suit local conditions. Conduit programs in the EU are predominantly single borrower transactions and have just been introduced in Australia. Single borrower transactions are the dominant issuance vehicles in both the EU and Australia. In the US multi-borrower conduit transactions dominate.

The last few years have seen spreads tighten in US, EU and Australia, showing the appeal of CMBS as a funding source. The performance of CMBSs has also been good as characterised by the number of CMBS credit rating upgrades outstripping downgrades. This is attributable to the strong property performance supported by improving business climate and the persistently low interest rate environment which has spurred demand for alternative investments, such as real estate, as part of the broadening hunt for higher yielding, and commensurately riskier assets (ECB 2007: 58).

The Australian CMBS market is well matured as can be seen by comparison with the much bigger US and EU CMBS markets. High property market transparency (Jones Lang LaSalle 2006b) and predominance of LPTs as CMBS issuers (Standard & Poor's 2005b), who legally have to report their activities and underlying collateral performance to regulatory regimes such as ASX/ASIC and their equity partners, have contributed to the success of the Australian CMBS market.

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Financing Infrastructure Using Asset-Backed Securities: Lessons for Developing Countries

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Abstract

Purpose*: The purpose of the paper is to investigate how structured debt or asset-backed securitisation (ABS) can be used to fund infrastructure development in developing countries.*

Design/methodology/approach*: A case study on how ABS has been used to fund infrastructure in Australia is presented and lessons that developing countries can learn from the Australian experience pointed out.*

Findings: *Huge amounts of funds are being poured into infrastructural investment. However, much of this activity is occurring in developed countries with little activity in developing countries. Developing countries can participate in this windfall if clear policies, well-functioning institutions, and well led out regulations are put in place.*

Originality/value*: ABS is seen an innovative way of funding infrastructure.*

Paper type: Research paper

Key words Infrastructure financing, asset-backed securitisation, developing countries.

1.0 Introduction

The shortage of infrastructure in developing countries is an important obstacle to meeting populations' needs, to enterprise development and to achieving the Millennium Declaration Goals (MDG). The needs for infrastructure investment worldwide in the coming decades are estimated at levels exceeding US$1,800 billion per year (OECD 2007). To meet MDGs for infrastructure, for example, Africa needs an estimated US$5-US$12 billion a year in additional infrastructure finance (Estache 2004). If such amounts are to be raised, policy-makers need to mobilise all potential sources of capital and consider innovative schemes for infrastructure financing. To sustain infrastructure systems, adequate financing is also necessary (Fox 1994). Traditional sources for the initial investment are central government grants, donor funds and private-equity (or self-help) financing with user fees being the most viable option in the operational and maintenance stage. Unfortunately, in most developing

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countries these traditional infrastructural development funding sources have proven to be inadequate as evidenced by increased budget deficits. Most developing countries are riddled with high economic deficits, with inadequate amounts spared for infrastructural development.

Limited public resources for infrastructure provision and the promise of better efficiency from private funding of public infrastructure have led to the transfer of risks to private parties through privatisation of public infrastructure enterprises for existing assets and public private partnerships (PPPs) for new assets. In most developed countries the principal vehicle of delivering PPP's is through private finance initiative (PFI). Developing countries have also started using PPI's to deliver PPP's.` Extensive literature exists on PPPs and PFIs mainly on the United Kingdom (UK) and on other countries following the UK lead. Dixon (2005) and Hodge (2004) present comprehensive overviews of the PPP market in UK and Australia respectively. Structured debt or asset-backed securitisation (ABS) is seen an innovative way of funding infrastructure. For instance, when Macquarie Infrastructure Group (MIG) and its Spanish partner, Cintra paid US$3.8 billion for a 75-year lease on the Indiana Toll Road in the United States (US) this year, they put up US$385 billion of equity for their US$1.9 billion stake. The balance of US$1,515 billion was in form of structured debt (Chancellor 2007).

However, despite the increased use of structured debt to fund infrastructure, only limited research regarding ABS as a funding tool for infrastructure development `in developing countries has been conducted. As such the purpose of this paper is to assess how ABSs can be used to fund infrastructure in developing countries; particularly highlighting issues such as the current infrastructure investment market in Australia and other developed countries, the significance of infrastructure in economic development, mechanisms behind operating asset securitisation, and the lessons that can be learned by developing countries from Australian experience in funding infrastructure development.

The remainder of the paper is organised as follows. In sections 2 and 3, we present the definition of infrastructure, its market characteristics and its significance to economic development. Section 4 introduces ABS as a tool to fund infrastructure. A case study were ABS was used to fund infrastructure in Australia is presented in section 5. Section 6 outlines lessons that can be learned by developing countries from Australian experience in funding infrastructure development. Finally, we conclude in section 7.

3.0 Infrastructure: Definition and Market Characteristics

Andersson, et al. (1997) define infrastructure – be it material or non-material, tangible or intangible – as a public good of substantial durability. Infrastructure can be classified into economic infrastructure (eg: utilities, toll roads, airports, pipelines, power stations and wind farms) and social infrastructure (e.g: healthcare facilities, education facilities and correctional facilities) (RREEF 2005). Its classification is continually evolving though with MIG's bid for the London Stock Exchange earlier this year deemed to be financial infrastructure. Financial infrastructure is said to be distinguishable from traditional infrastructure on account of being more vulnerable to technological change and the vagaries of the business cycle (Chancellor 2007).

Infrastructure has similar investment characteristics to property investment; albeit with some significant differences which support treating it as separate asset sector (Blundell 2006; O'Sullivan 2005; RREEF 2005). A comparison of the characteristics of infrastructure investment and property investment is shown in Table 1.

Table 1: Characteristics of Infrastructure and Property Investments

Characteristics	*Infrastructure*	*Property*
Typical investment size:	▪ Higher	▪ Lower
Competition:	▪ High competition for quality assets	▪ High competition for quality assets
Asset availability:	▪ Asset scarcity; many in unique, monopoly situations	▪ Moderate to deep volumes in most markets
Acquisition dynamic:	▪ Competitive tenders, regulatory, environmental, social and political issues, often held for the long term	▪ Competitive tenders, environmental and social issues common
Lquidity:	▪ Moderate	▪ Moderate in most sectors

Source:RREEF (2005)

Institutional investors have also identified the characteristics of infrastructure (Mercer 2005; RREEF 2005; UBS Investment Research 2006) to include:

- Monopolistic characteristics,
- Captive customer base,
- Predictable earnings and cash flow via regulation and/or long-term contracts,
- High operating margins,
- Low volatility of cash flows,
- High probability of distributions of returns,
- Low correlation of returns versus other asset classes
- Long asset life,
- Large investment scale

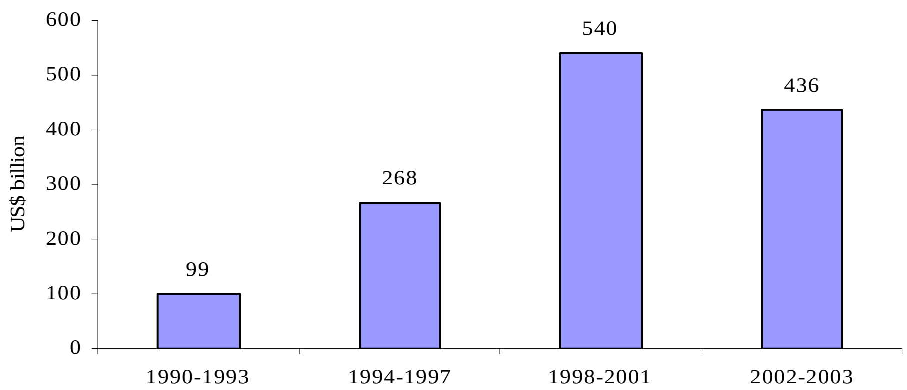
These unique and attractive characteristics of infrastructure have seen increased interest from investors seeking income-oriented returns and diversification benefits. In Australia, infrastructure contributed the highest returns, as well as the highest volatility, and offered diversification benefits, particularly with unlisted infrastructure, in investment portfolios during the period Q3:1995-Q2:2006 (Peng & Newell 2007). Some of the major Australian investors in infrastructure are Macquarie Infrastructure Group, Macquarie Airports, Babcock and Brown Infrastructure Group, SP AusNet and Alinta Infrastructure Holdings). In Australia, the two main drivers of investing in infrastructure are capital inflows from superannuation funds (Nielson 2005) and budgetary pressures on governments to reduce infrastructure spending (McCarthy 2006; Mercer 2005; RREEF 2005). Superannuation fund investment in infrastructure will increase to AU$65 billion by 2012, from AU$8 billion in 2002 (Nielson 2005). Government spending on infrastructure has been reduced from around 14% in 1970 to 5% in 2005 (Mercer 2005).

Infrastructure is now one of the world’s fastest growing investment asset classes with a current market value of over US$1,600 billion. In 2006, an enormous US$147 billion of infrastructure deals occurred, up from US$34 billion in 2004 (Jones 2007). Market growth is being lead by private infrastructure funds as depicted by their astounding increase: 10 new funds where raised and another 17 not closed as at November 2006. New players include the likes of ABN AMRO Bank N.V, 3i Group PLC, The Carlyle Group, and the Henderson Group investors PLC. The average size of the funds is similarly growing, rising from ₤150 million in 2000 to ₤350 million in 2006 (Standard & Poor's 2007a). Peng and Newell (2007) show the size of the Australian infrastructure investment market, excluding direct investment in infrastructure projects, as approximately AU$83 billion (16 listed infrastructure funds:

AU$52 billion; 16 listed infrastructure companies: AU$27 billion; 19 unlisted infrastructure funds: AU$4 billion) with more than 290 infrastructure assets. Standard and Poor’s (2007a) rated 20 European deals worth €5.4 billion in 2006 alone. The infrastructure investment market is still growing with US$100 billion-US$150 billion of fund money raised and waiting to be invested (Standard & Poor's 2007a). Adding in debt, this money could be used to finance deals worth US$500 billion to US$1 trillion (Chancellor 2007).

The high demand for infrastructure has also seen asset values soar and increases in debt-to-EBITDA (earnings before income tax, depreciation and amortisation) multiples, while equity contributions have been decreasing. Debt-to-EBITDA multiples in some recent deals have ranged from 12x to 30x (Standard & Poor's 2007a). Debt funding in infrastructure acquisitions increased from US$99.4 billion between 1990-1993 to US$436 billion between 2002-2003; see Figure 1. Issuance of infrastructure bonds played an important role in debt funding with 208 bonds to a total value of US$43.3 billion issued between 1994 and November 2003 (World Bank 2004).

Figure 1: Global Annual Average of Debt Financing for Infrastructure



Source:Dealogic Bondware

4.0 Significance of Infrastructure to Economic Development

Lakshmanan et al. (1985) assert that infrastructure or social overhead capital provides basic services without which most primary, secondary or service activities cannot operate effectively. Good infrastructure provides key economic services efficiently, improves the economy’s competitiveness, generates high productivity and supports strong economic growth. It is therefore essential for the development of a region and the national economy as a whole. This more so important for sub-Saharan Africa whose economic problems are exemplified by inadequate infrastructure, weak institutions and institutional capacity, and huge internal and external funding imbalances (Ebohon et al. 2002), despite facing large increases in demand for public infrastructure services as a result of fast urban population growth rate (Bjorvatn 2000). Rapid population increase should be viewed as a potential market and not as a drawback to regional development. Andersson and Andersson (2000) ably stated that “a high density of demand on matching infrastructure for interaction provides the region with a large *internal market* in which to operate economic activities at low transaction costs….. By means of a large and dense internal market potential a gateway region can attract flows from the rest of the world”. This view is further supported by Johansson (1996) who contends that economic performance and evolution are influenced by density in combination with infrastructure. A review of economic research on the necessity of infrastructure in achieving the MDGs by developing countries can be found in Estache (2004).

According to Fox (1994) provision of infrastructure services can influence economic output through both the supply and the demand sides of the economy.

The supply-side effects are:

i. Services like electricity and water can be direct inputs into production.
ii. It is a complement to private capital or labour i.e. it makes other inputs more productive and lessens the wasteful use of natural resources.
iii. It can indirectly increase an area’s overall ability to produce by attracting workers or private capital from other regions.

The demand-side effects are:

i. It creates income for those directly employed as well as for supplier firms. The spending and responding of these directly created incomes can create a multiplier effect on the economy.
ii. Infrastructure investments can crowd-out or crowd-in private investment. Crowding-in occurs when development of infrastructure encourages more private investment. Crowding-out takes place when private investment is replaced by infrastructure. The relative strength of these different forms of crowding depends on a number of factors,

including how infrastructure is financed, whether there are unemployed resources available in the economy, and how savings and investment respond to interest rates.

iii. Greater demand for infrastructure is expected as an economy develops because people (and businesses) purchase more water, electricity, and other services as their incomes rise.

Therefore, having an adequate infrastructure base supports urban areas and also acts as a catalyst for economic development.

The current infrastructure status quo in most developing countries can best be summed up using Fox' (1994) words:

> "The condition of infrastructure facilities is poor, the services provided are inferior, and the financing systems are inadequate"

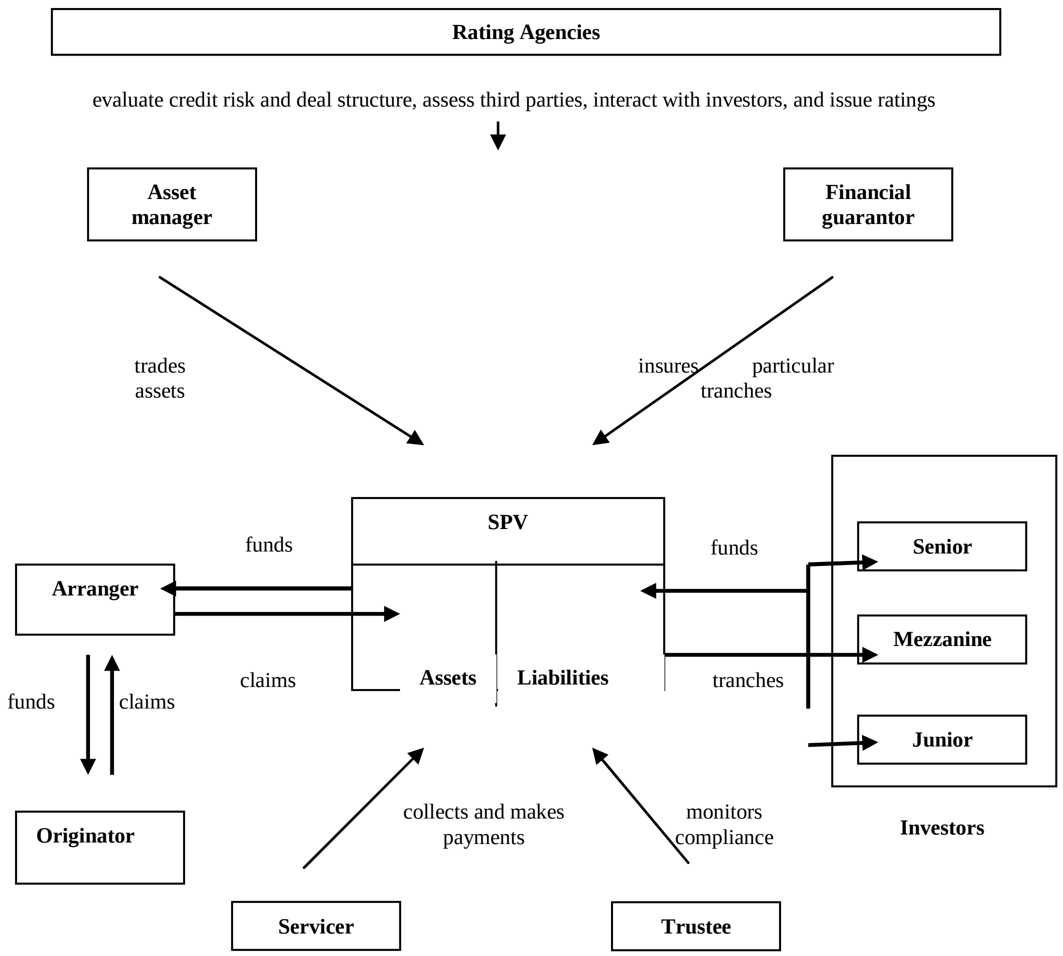
Aaltonen et al. (1994) in their study entitled "Impact of The Urban Growth on The Lusaka Physical Environmental" revealed poor infrastructure and environment conditions in Lusaka, Zambia as summarised in Appendix 1. The situation has not changed much from the time of their study and in some cases it has even become worse. These observations are not only peculiar to Zambia but most developing countries as well.

3.0 Financing Infrastructure Using Asset-Backed Securities

3.1 Fundamentals of Asset-Backed Securitisation

Asset backed securitisation (ABS), sometimes merely referred to as asset securitization, is a creative financing arrangement whereby debt instruments backed by assets such as mortgages, cash flows generated from the assets, are issued and offered for investment purposes in the capital markets (Ong et al. 2000). Alles (2001) defines asset securitisation as a process where ill-liquid assets owned by a financial institution, are pooled and sold in the legal or economic sense, to a third party referred to a special-purpose vehicle (SPV). The legal transfer or separation of the asset to an SPV that issues bonds is the key feature that distinguishes an asset securitization arrangement from the traditional mortgage-backed or collateralised bond issues. The parties that are involved in structuring an asset-backed security are depicted graphically in Figure 2 below.

Figure 2: Structured finance: key market participants



Source: Working Group (2005)

Credit enhancement is undertaken to act as a "ring-fence" around the assets to avoid insolvency and also results in a higher rating of the bonds issued. By doing this, the bond issuer increases the credit protection of the bondholders. Some of the credit enhancement techniques that are used are: credit tranching; overcollateralisation; cash collateralisation; reserve funds; spread accounts; amortisation triggers; related party guarantees; letters of credit; monocline insurance; and multiline insurance.

The new obligations are of different form than the assets- different maturity, currency, security, or interest rate-and because of this difference are more attractive to investors. The differences are often related to credit ratings. The theory of why ABS works is that the sum of parts is greater than the whole (Partnoy 1999). As a result, transaction risks amongst many investors in several classes of securities known as tranches can be spread (Geltner & Miller 2001). The credit quality of the security is directly related to the yield of the issue. The higher the credit quality the lower will be yield and the more successful will be the issue (Alles 2001).

According to Henderson & ING Barings (1997) factors that support securitization are provision of:

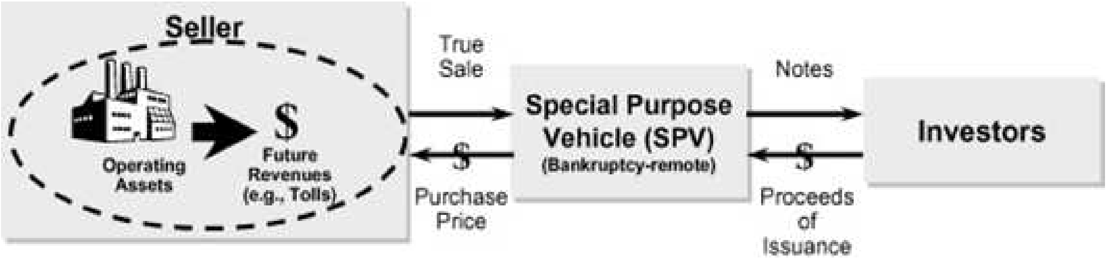
- funds at attractive rates as a result of the added credit enhancement and resulting higher credit rating;
- improved company's return on capital. Structured correctly, a securitization will remove securitised assets from the originator's balance sheet, thus generating cash flow without increasing debt;
- being an alternative source of funding; and
- matched funding for medium and long-term receivables.

The limits of the securitisation transaction can be found on the cost side and on the legal and structuring side. For example, in Singapore outright sale brokerage costs are between 0.5% and 1.0% of the selling price, whereas the total cost of asset securitisation is in the region of 1.5% to 2%, excluding the extra management effort and time involved in structuring such deals (Ooi et al. 2003). The cost of securitisation includes front-end fees and expenses, the running cost of debt funding, the running cost of ancillary facilities and the cost of first loss cover or credit enhancement. For the securitisation process to be viable, the cash flows derived from the issue of securities must exceed the costs associated with creating and carrying out the securitisation process, in present value terms (Alles 2001).

3.2 Operating Asset Securitization

Infrastructure assets as discussed earlier in 2.0, have characteristics that make them suitable for securitisation as entities. This form of securitisation is known as Operating Asset Securitisation (OAS). OAS is the sale of future revenues from specific operating asset, such as bridges, toll roads, prisons, water projects, electric power transmission lines, local power distribution systems. It requires the certainty of predictable cash flows, a long track record, strong resilience to economic downturns, and high barriers to entry (Glenn 2007). Investors have a claim on the operating assets themselves. Other terminologies used to describe this form of securitisation are 'whole-business securitisation' and 'corporate securitisation.' Operating asset securitisation can be illustrated as shown in Figure 3.

Figure 3: Operating Asset Securitization



In developing countries most of the future flow of securitisations are initiated by originators, whose offshore borrowing abilities are often stymied by the sovereign rating of the country where the originator is located (Ketkar & Ratha 2001). Securitising future receivables can enable developing countries to surpass the sovereign credit ceilings, borrow with better credit and fulfil financing in the international capital markets. Ketkar and Ratha (2001) and Ratha (2002) illustrate how this can be done through developing borrower countries selling their future production or receivables to an offshore special purpose vehicle, which then issues the debt instruments. Through a legal arrangement between the borrower and major international customers, payments for the receivables are deposited in an offshore account managed by a trustee. The debt is serviced from this account, with any excess collections transferred to the borrower. With a higher rating and lower risk for the securities supported by future flow, these developing countries can assume lower risk premiums and lower corresponding interest expense (Liu et al. 2007).

4.0 Australian Infrastructure ABS Case Study: Wyuna Water

Wyuna Water Pty Limited (Wyuna Water) owns two water filtration plants that provide drinking water to approximately 500,000 people in the Sydney's southern suburbs and the Illawarra region. The company is 70% owned by ABN AMRO and 30% by Veolia Water Australia Limited, which is also the operator. Delivered at a cost of AU$180 million, the two plants have a combined production capacity of 370 ML/day and can be upgraded to provide an ultimate capacity of 534 ML/day. Wyuna Water designed, constructed and financed the project, and subsequently operates the two water filtration plants under a 25-year BOO contract. Veolia Water Systems Australia process designed the plants.

In August 2003, ABN AMRO's Infrastructure Capital team delivered a structured solution that repaid existing bank facilities and issued AU$185 million of new debt in the form of long-term capital market bonds.

Details of the bond transaction are as follows:

Tranche 1
Issue Size: AU$ 132.89 million
Maturity: 30 June 2021
Structure: Nominal Annuity Bonds, paid quarterly
Pricing: Yield of 6.477% or 69 basis points over the equivalent modified duration swap rate
Rating: Aa2 (Moody's Investor Services)

Tranche 2
Issue Size: AU$22.17 million
Maturity: 30 March, 2022
Structure: Inflation Linked Annuity Bonds, paid quarterly
Yield: 3.945% or 50 basis points over the 2015 government bond.
Rating: Aa2 (Moody's Investor Services)

Tranche 3
Issue Size: AU$30 million
Maturity: 30 March 2021
Structure: Capital Inflation Linked Bonds, paid quarterly
Yield: 4.31% or 80 basis points over the August 2020 government bond.
Rating: Aa2 (Moody's Investor Services)

The multi-tranche issue was well received by investors, particularly domestic funds, who were attracted by the characteristics of the asset class and the range of bonds on offer.

Servicing of bond payments ultimately comes from water usage fees. This financing mechanism can be emulated in developing countries to develop similar water supply schemes, albeit with clear policies, well-functioning institutions, and well led out regulations to support it. Though the experience of private sector provision of water supply in developing countries is fraught with much controversy surrounding it, ABS can be used as a funding tool albeit with clear policies, well-functioning institutions, well led out regulations, proper valuation assessment of assets and ABS structures. These matters are discussed more fully below.

5.0 Lessons for Developing Countries

5.1 Financial, Regulatory and Policy Issues

The bottlenecks in ensuring a healthy flow of capital from international markets to developing country infrastructure are related to policies, institutions, and regulation. In relation to Africa, Sheppard et al (2006) state the following as impediments to its ability to tap both foreign and local currency markets to raise private finance for infrastructure, especially long-term debt finance:

- low or nonexistent sovereign credit ratings. Only 16 of 48 countries have foreign currency debt ratings, and only 4 of these have ratings of BB- or higher, which provide relatively broad access to financial markets;
- most local financial markets have limited capacity to finance infrastructure projects; and
- features typical of infrastructure projects raise the risk of investments. These projects are susceptible to political and regulatory interference due to their longer payback and build-out periods.

Therefore, to promote more direct foreign investment in infrastructural assets the following need to be addressed (Sheppard et al. 2006; World Bank 2004):

- development of strong institutional framework for protecting creditors' rights, effective covenants, and reliable avenues for legal enforcement and remedy. Bond investors respond to a strong institutional framework by lowering the cost of capital;
- improving the credit worthiness of public entities, such as municipal utilities and parastatal corporations, for them to access global and domestic capital markets. These will remain major players in the financing, development, and delivery of infrastructure services in many developing countries. Investment planning, financial reporting, and corporate governance will need to be improved;

- developing viable public-private risk-mitigation and financing instruments capable of addressing a host of political, currency, credit, contractual, and regulatory risks;
- embarking on financial sector reform. The capacity of local capital markets, both as a source of long-term local currency finance and as a hedge against currency risk, needs to be strengthened. Pension reforms under way in several countries could increase long-term savings and transform them into investment funds for infrastructure;
- development of more transparent procedures for project selection, appraisal and award of contracts. Furthermore, capacity building in procurement of public assets is needed; and
- local bond issues to finance infrastructure projects should initially carry full or almost full guarantees by governments, official agencies, commercial banks, or local private institutions until the market develops. For example, the partial risk guarantee against regulatory default by the World Bank for the concession of Uganda's electricity distribution company played a key part in attracting private investors.

In relation to the promotion of the development of an ABS market in developing countries, Alles (2001) sets out the following as factors that need to be addressed:

- Legal Environment*:* the necessary legal provisions are needed to promote the development of an ABS market such as the law under which trusts and SPVs are created and the manner in which assets are transferred from originator to securitisation vehicle. Legal provision is also needed for registration of securities and provision of information disclosure.
- Taxation Issues: the impact of taxation could be a key factor that determines the profitability of securitisation and hence its viability. Issues of whether the SPV or trust is subject to taxation or not and the implication of tax on the transfer of assets between the originator and the SPV are important. Other taxation issues relate to the levies on issue of securities.
- Accounting Issues: current accounting guidelines as developed by the international accounting bodies for uniformity in accounting treatment of asset sales, revenue recognition and information disclosures relating to securitisation need to be considered.
- Regulatory Issues: these are designed to ensure that financial institutions do not run into situations of illiquidity or insolvency, situations that can potentially trigger a

banking sector collapse and consequent paralysis of the economy. The Basel II capital accord has been adopted as a framework maintaining banks' capital adequacy.

The above stated are neither definitive nor exhaustive but form the basis of developing an ABS market to fund infrastructure. Developing countries can learn from Australian experience of compulsory superannuation and having a well developed transparent commercial property market. As alluded to earlier, compulsory superannuation contributions have immensely contributed to growth not only in the direct and indirect property markets, but also in the infrastructure market. A key factor in the success of ABSs as a funding source for infrastructure is the high market transparency and well developed securitisation market. Australia is one of the most transparent property markets, ranked first together with the USA (Jones Lang LaSalle 2006b)[38] and has the most highly securitised commercial property market in the world (Hughes & Arissen 2005).

5.2 Structuring ABSs

ABSs are complex funding structures and the inherent risks need to be understood by all the parties involved. Risk assessment is mainly by building a cash flow model for the deal and undertaking simulation tests on the input factors such as various macro economic and market conditions, including the possible default of counterparties.. This gives a feel for the sensitivity of the deal, but does not assess probabilities. Quantitative assessment of ABS deals is typically very difficult due to the complexity of their legal structures with conditional income payments, uncertain costs, complex, conditional loan amortization patterns and multiple currencies, reserves, hedges and guarantees. By the nature of the market, new deal structures are always evolving so there is little applicable historical default data to guide the risk assessment of the latest deal structures.

Projecting cash flows with certainty is problematic in ABSs. A case in point is the failed Cross City Tunnel (CCT) PPP in Sydney, Australia. The CCT was designed to ease congestion in Australia's largest city, but revenue lagged forecasts and was placed into receivership in December 2006 owing banks including Westpac Banking Corp. and Deutsche

[38] Jones Lang LaSalle define transparency as "as any open and clearly organized real estate market operating in a legal and regulatory framework that is characterized by a consistent approach to the enforcement of rules and regulations and that respects private property rights. Further, the ethical and professional standards of private sector advisors, agents and brokers who are licensed to conduct business in each country are supposed to high".

Bank some AU$560 million (US$452 million). The AU$680 million tunnel, which is Sydney's first fully electronic toll road, runs 2.1 kilometres (1.3 miles) east to west beneath Sydney's central business district. Initial projections forecast 90,000 trips a day within 18 months of its opening in August 2005, but the number only reached one-third of that level before the receivers were called in amid driver complaints about the high charges to use it, even after tolls were reduced (Reuters Limited 2007).

Bethwaite (2005) points out the following lessons from the CCT case which can be applicable to most PPPs:

- the need for greater transparency in PPP contracts. Both private sector and Government need to be more open about questions regarding risk and pricing;
- PPPs should not be used as instruments against competition. PPPs should be able to stack up without closing down competition; in the case of CCT, letting drivers choose travel alternatives; and
- better and more flexible pricing models of PPPs are needed.

The long-term nature of these transactions also makes risk forecasting difficult. According to Bruce Whittaker[39] it is standard practice in ABS transactions to "wrap" all unforeseeable risks through insurance and other credit enhancement techniques. This enhancement comes at a price; the more the enhancement, the higher the transaction costs.

Further, setting discount rates when analysing long-term leases presents problems when undertaking feasibility studies of ABS. In some instances, the use of a wrong discount rate has resulted in the sale transaction having a negative present value when the net sale proceeds are compared with the lease payments over the long term lease. It may result in originator of the ABS "gaining for the moment for future pain". A case in point is the sale and lease back of the Australian Defence College at Weston Creek which was sold for $31.7m with subsequent rental payments due under a 20-year term amounting to $59.9m and could result in a negative net present value (McLennan 2004).

Armstrong and Fletcher (2004) in their study on the securitisation of student hostel rentals at Keele University concluded that, securitisation can be expensive not so much in the rate of interest but the sheer length of time for which the money is effectively borrowed. In their

[39] Conversation with Bruce Whittaker of Blake Dawson Waldron, Melbourne in June 2005.

analysis Keele University had borrowed £1 at a cost £2.16 at 2000 prices over a 30 year period. They concluded that securitisation was no cheaper that straightforward borrowing as a means of obtaining capital. Other studies, such as Ooi (2003), have had contradictory conclusions that the over all interest rate in ABS transactions could be lower than it would be on a traditional mortgage loan. Further still, loan-to-value ratios in ABS transactions could be higher than in traditional mortgage bank financing (Breidenbach 2003). Adding to the debate further, Ooi (2003) concluded in their study that though securitisation was more expensive and time consuming than an outright sale, securitisation could be the only option for some high-value property owners to find buyers, especially in weak markets.

Other classic ABS structuring debacles have included Leeds United Football club in the UK (Armstrong & Fletcher 2004) and LTV Steel Company Inc in the USA (Stack 2002). In 2002, Leeds United issued loan notes to the tune of £60m against 25 years of future gate receipts in order to finance the purchase of players. By April 2003, the club was facing the prospect of administration. Its debts had reached £78m, even after selling five star players. The team did not perform on the pitch and the spectators stayed away. The football stadium was used as part of security with ticket sales meant to service coupon payment. In the LTV Steel Company Inc ABS transaction, the ABS structure was designed in such a way that it deeply affected the core of the originator’s business disabling them from operating as a going concern if deprived of the assets transferred to the SPV. All ABS transactions are structured as “true sales” to safe guard the interests of bond holders in case of the SPV being insolvent.

The above cases illustrate the need to properly structure ABS if they are to be used as alternative sources of funding infrastructure development.

5.3 Asset Valuation

Most ABS transactions are structured in such a way that the cash flow from lease payments, user fees and other income are sufficient enough to cover the coupon payments of the issued bonds and the financing costs of the transaction. Therefore, valuation of infrastructural assets lies at the heart of the success of these funding tools. The assessment of valuation of infrastructure can be a useful process when a government needs to determine the financial value of public infrastructure projects before and after construction. Some purposes of valuation include financial reporting, privatisation planning, loan origination, bond issuance, and the cost-benefit or economic analyses. Governments or quasi-government entities perform cost-benefit or economic analyses either to determine whether a public sector asset is being used and managed efficiently or to set a price for monopoly service.

In the case of existing assets, various authors (Akakandelwa 2006; Bond & Dent 1996; Connellan 1997; French 2004; Pagourtzi et al. 2003), among others, contend that the most appropriate method of valuing specialised and limited market properties, such as infrastructure, is the Depreciated Replacement Cost (DRC) approach in line with International Valuation Guidance Note No. 8 (IVSC 2005). Thomson (1993) cited in Bond (2003: 10), in support of using DCF for valuing crown assets, contends that the sales comparison approach is inappropriate as these assets are rarely traded so little market evidence exists upon which is approach relies. He further states that the income approach is equally inappropriate as these assets are (often) monopolistic businesses as price of services are not set by market forces and thus do not reflect Net Current Worth. Furthermore, French (2004) states that specialised properties involve the owner-occupier's views of worth of the property, i.e. the contribution it will make to business profit, as well as subjective issues such as status and feelings of security. He further contends that valuers can only attempt to replicate these calculations of worth in arriving at an estimate of exchange price by reliance on an accepted valuation model, such as DRC.

The DRC is defined as "The current cost of replacing an asset with a modern equivalent asset less deductions for physical deterioration and all relevant forms of obsolescence and optimitisation" (IVSC 2006a:14; 2006b:5). The issue of how to account for depreciation in this approach has always been debatable and the guidelines are meant for uniform application of the approach.

The role of valuers has been expanded to value non-traditional asset classes such as infrastructure (Bond 2003) with some national bodies, such as the National Asset Management Steering Group in New Zealand (National Asset Management Steering Group 2006), setting up guidelines on valuation and accounting for depreciation in infrastructure assets. Their role is also recognised in the valuation of real estate serving as collateral for securitised instruments (IVSC 2006c). This also applies to instances were infrastructure has been financed using bonds.

The foregoing highlight the need for valuers in developing countries to adopt internationally accepted valuation approaches and also to be well versed in guidelines on valuation and depreciation of infrastructure assets. ABSs can only be successfully used as a tool to fund infrastructure if the value of the underlying asset backing are correctly assessed.

6.0 Conclusion

Huge amounts of funds are being poured into infrastructural investment due to the high returns and diversification benefits from this asset class. Demand for infrastructure assets is so high that their values have soared and debt-to-EBITDA multiples have risen to record levels. However, much of this activity is occurring in developed countries with little activity in developing countries. Developing countries can participate in this windfall if clear policies, well-functioning institutions, and well led out regulations. These should be in place for international investors to safe-guard their investments.

The importance of infrastructure to economic development can not be over-emphasised. Developing countries lack adequate resources to develop infrastructure at the detriment of economic development. New innovative ways of funding infrastructure, such as ABSs, being used in developed countries could be adopted as funding tools. The use of ABS in Australia to fund infrastructure offers a good example for developing countries to emulate. The ABS market in Australia is well developed due to the high market transparency and well developed property market.

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